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Effect of Cross-Border Investments on European Private Equity Buyout Fund Performance

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During the past decades, the private equity industry has grown substantially and the current level of fundraising and amounts of dry powder suggest that it is not easy for funds to find favorable deals. A possible means for funds to alleviate this issue as the industry matures is to look across borders in search for deal flow. Cross-border private equity investing has previously been associated with challenges related to cultural distance and differences in the institutional environments while increased opportunities are associated with improved performance. In addition, the research around cross-border private equity mostly focuses on the venture capital industry with buyouts receiving little attention.

This study explores the relationship between cross-border investing and European buyout fund performance by analyzing the effect of cross-border share of investments on fund IRRs. This effect is analyzed from both general cross-border as well as cross-continent viewpoints. Moreover, the interaction effects of fund size, club deals and local offices, that are suggested remedies for overcoming challenges in cross-border settings, are studied. The hypotheses are formed by synthesizing previous literature on cross-border private equity and fund performance and tested using regression analysis on a sample from Preqin consisting of European buyout funds with vintages from 2000 to 2010 and corresponding deal data until early 2019.

The results imply that universal positive effects of cross-border share on fund performance are not supported. Rather, the effects are contingent upon a few circumstances. First, high cross-border focus seems to improve returns for large funds, whereas for smaller funds the effect is negative. Large funds may be induced to invest across borders in order to perform and are likely more skilled in international investing. Next, the effects are positive for the local office deal share suggesting that weaker performance is associated with pure cross-border deals, while cross-border settings can increase opportunities if the fund operates through a local branch. Finally, the results indicate a positive effect for the share of investments made across continents suggesting that success might be dependent on distance, although more research on this is warranted.

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Pääomasijoitusmarkkina on viime vuosikymmenien aikana kasvanut merkittävästi ja tämän hetkiset rahastojen varojenkeruun ja sijoittamattoman pääoman tasot osoittavat, ettei suosiollisten ostokohteiden löytäminen ole helppoa. Yksi mahdollinen tapa rahastoille tämän ongelman lievittämiseksi on katsoa yli maarajojen hankevirtaa etsiessä. Maarajat ylittävä pääomasijoittaminen on aiemmin yhdistetty kulttuurilliseen etäisyyteen ja institutionaalisten ympäristöjen eroavaisuuksiin liittyviin ongelmiin, kun taas lisääntyneet mahdollisuudet ovat yhdistetty parantuneeseen performanssiin. Lisäksi, maarajat ylittävään pääomasijoittamiseen liittyvä tutkimus keskittyy pitkälti venture capital-toimialaan ja buyout-toimiala on jäänyt pienelle huomiolle.

Tämä tutkimus tarkastelee maarajat ylittävien sijoitusten ja eurooppalaisten buyout-rahastojen tuottojen välistä suhdetta analysoimalla rahaston maarajat ylittävien sijoitusten osuuden vaikutusta rahastojen tuottoon. Vaikutusta analysoidaan sekä yleisesti maarajat ylittävien sijoitusten että mannerten ylittävien sijoitusten osuuksien näkökulmasta. Lisäksi rahastojen koon, syndikoitujen kauppojen ja paikallisten toimistojen, eli tekijöiden, joita on ehdotettu maarajat ylittävän pääomasijoittamisen haasteiden lievittäjiksi, moderoivaa vaikutusta tutkitaan. Hypoteesit on muodostettu syntetisoimalla aiempaa maarajat ylittävää pääomasijoittamista sekä rahastojen tuottoja käsittelevää kirjallisuutta ja niitä testataan regressioanalyysillä. Tutkimuksen datana toimii Preqin-tietokannasta haettu otos, joka koostuu eurooppalaisista buyout-rahastoista, jotka on kerätty vuosina 2000 – 2010, sekä näiden tekemien kauppojen tiedoista aina vuoden 2019 alkuun asti.

Tulokset implikoivat, ettei perusteita yleisesti positiivisille maarajat ylittävien sijoituksien osuuden vaikutuksille rahaston tuottoihin ole. Sen sijaan, vaikutukset riippuvat muutamista tekijöistä. Ensiksi, korkea maarajat ylittävien sijoituksien osuus näyttäisi parantavan isojen rahastojen tuottoja kun taas pienillä rahastoilla vaikutus on negatiivinen. Isojen rahastojen voi olla parempi investoida maarajojen yli menestyäkseen ja ne ovat myös todennäköisesti taitavampia kansainvälisessä sijoitustoiminnassa. Toiseksi, paikallisten toimistojen kautta tehtyjen sijoitusten osuuden vaikutukset ovat positiiviset, mikä indikoi, että maarajojen ylittäminen voi parantaa mahdollisuuksia jos pääomasijoittaja toimii paikallisen toimiston kautta. Viimeiseksi, tulokset indikoivat, että mannerten yli tehtyjen investointien osuus vaikuttaa tuottoihin positiivisesti eli menestyminen saattaa olla riippuvainen etäisyydestä, mutta tämän ilmiön vahvistaminen vaatii lisätutkimusta.

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Helsinki, 12.6.2019

Joel Heinikoski

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1 Introduction

1.1 Background

The private equity industry has seen tremendous growth during the past years. In search for returns, limited partners – the investors of private equity funds – have increasingly shown trust towards the industry in the form of directed capital, which has led to private equity fundraising to reach its all-time highs. Figure 1 shows the global private equity volumes. While the market is growing, so is competition, and an increasing amount of the raised capital is left as dry powder. With also valuations being high as ever, it gets harder for private equity managers to find good investments, and although global private equity deal volumes have been rising, over the past couple of years deal counts have not.

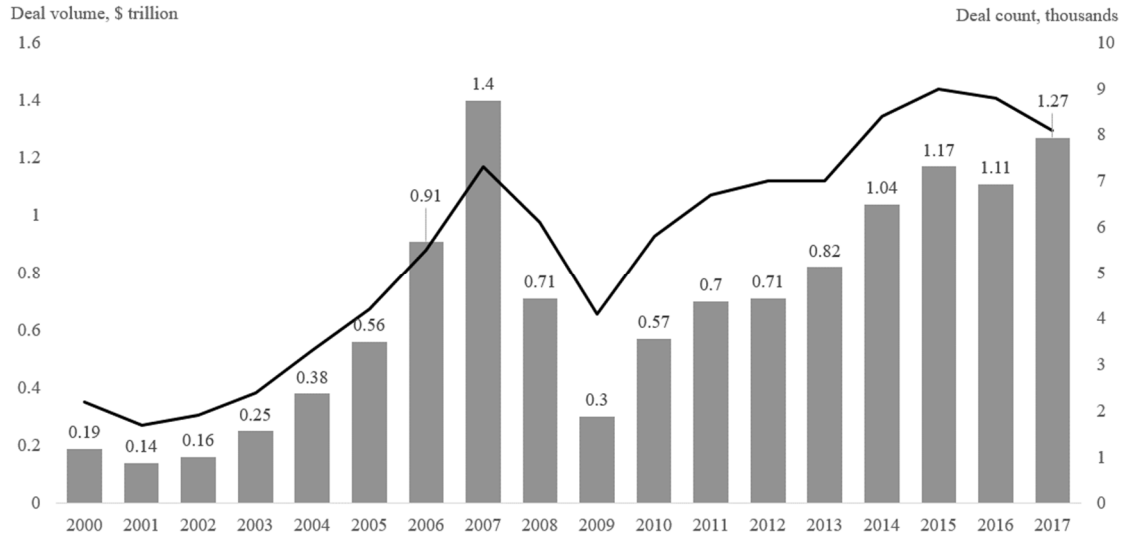

Figure 1: Global private equity deal volume and count (McKinsey & Company, 2018).

Given the competition and the heating market, it would be valuable to understand where the performance of the private equity industry comes from. Just like with other asset classes, history is not a guarantee of future performance in private equity (Braun, Jenkinson, & Stoff, 2017), and limited partners need to carefully evaluate where to direct their capital. Much of the existing literature studying private equity fund returns focuses on analyzing the performance in comparison to that of the public market equivalents (for example Harris, Jenkinson, & Kaplan, 2014; Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009) with conflicting results in many cases.

Remarkably, the explanatory factors of fund returns have not been comprehensively explored, especially from the investing behavior or strategy viewpoints. Clearly, the private nature of the industry makes it difficult for researchers to carry out such studies since the companies do not often disclose thorough information leading to insufficient data. Prior research has mainly focused on fund characteristics and market effects in hopes of understanding fund performance drivers, as the persistence (Braun et al., 2017; Kaplan & Schoar, 2005), investor skills (Diller & Kaserer, 2009; Korteweg & Sorensen, 2017) and fund inflows (Gompers & Lerner, 2000; Harris, Jenkinson, & Kaplan, 2014; Kaplan & Strömberg, 2009) in fund performance context have been studied.

In search for better investments, general partners may be prompted to increasingly look across borders. While private equity activity has been high in the US for years, true growth in the countries outside the US did not occur until the mid-1990s (Aizenman & Kendall, 2008). This growth was driven by general globalization happening in business around the world as well as excess funds directed to US private equity funds during the technology bubble. This led to the private equity industry in the US to mature and US private equity managers started to export their skills. Today the number of active buyout private equity firms outside North America represents about a half of the total market (MacArthur, Rainey, & Dessard, 2018). On the other hand, according to Aizenman and Kendall (2008), the private equity deals outside the US include cross-border targets significantly more often than in the US.

Despite the frequency of cross-border participation in private equity deals, especially outside the US, the effects of it on buyout fund performance have not been studied. The currently existing cross-border private equity literature focuses on the legal and institutional environments of the countries (Cao, Cumming, Qian, & Wang, 2014; Cumming & Walz, 2010), geographical, social, and economical factors on capital flows (for example, Aizenman & Kendall, 2008), and syndication (Meuleman & Wright, 2011) or is otherwise heavily focused on venture capital. Holloway, Lee and Shen (2016) do study the relationship between performance and number of global acquisitions but they use performance as an independent variable for explaining the frequency of investments to a specific country.

The motivation for this study is driven by the scarcity of research focusing on explaining private equity fund returns and, more significantly, their relationship with cross-border

investments. In the increasingly competitive environment, general partners, and especially limited partners, are likely to focus on strategies that are proven to perform well. Particularly, buyout funds that have been dominating the fundraising and performance over the past few years (see for example MacArthur et al., 2018; McKinsey & Company, 2018), are a point of interest as their performance will largely dictate the future of the industry. Surprisingly, however, cross-border private equity research has heavily focused on venture capital while buyouts have gained little attention. This thesis therefore contributes to the literature of cross-border private equity, especially that of regarding buyouts, and provides guidance on the decision-making of whether cross-border investing could be a well-proven strategy.

1.2 Research objectives and questions

This thesis aims at analyzing the effects of cross-border private equity investments on fund performance. The objectives are to review related existing literature, seek supportive information from investment professionals, and carry out a quantitative analysis, that then contribute to the field of research with valuable new insights. Given the objectives, the research question of the thesis is formulated as:

- How does the level of cross-border investments in European private equity buyout funds affect the performance of the funds?

1.3 Research design, methodology and scope

1.3.1 Research design and methods

The research design of this thesis is twofold, consisting of a theoretical and an empirical part. Firstly, in the theoretical part, the current academic literature on cross-border private equity investments and private equity fund performance is systematically reviewed. This is to gain an understanding on what has been studied previously and what are the factors influencing cross-border private equity investments and fund performance. Hypotheses are then formulated based on the theory and findings in previous literature. In addition, interviews on Finnish private equity investment professionals are used in the hypotheses development. Secondly, the hypotheses are tested in the empirical analyses by using quantitative analysis methods on buyout fund and deal data.

1.3.2 Data sources

The data for the empirical part is sourced from the databases of Preqin, which provides data, solutions and insights for alternative assets industry globally. For the purposes of this thesis, both deal-level and fund-level data is retrieved. These sets of data are then matched in order to analyze the cross-border investments and performance in specific funds. Data for private equity firms' office information is sourced from company websites, news articles and Invest Europe directories.

1.3.3 Scope

The scope of this thesis regarding the type private equity is narrowed to only include the buyout branch. Figure 2 illustrates the different types and strategies of managed private markets. In terms of fundraising and assets under management, buyouts represent the most significant type of private markets making it a relevant and an interesting topic to focus on, and it provides the available data viewpoint. On the other hand, academic research is largely concentrated on the venture capital industry especially in the cross-border context. In addition, while cross-border investments and fund returns have been studied in the venture capital context (see Heliövaara, 2016), similar studies in the buyout field remain absent.

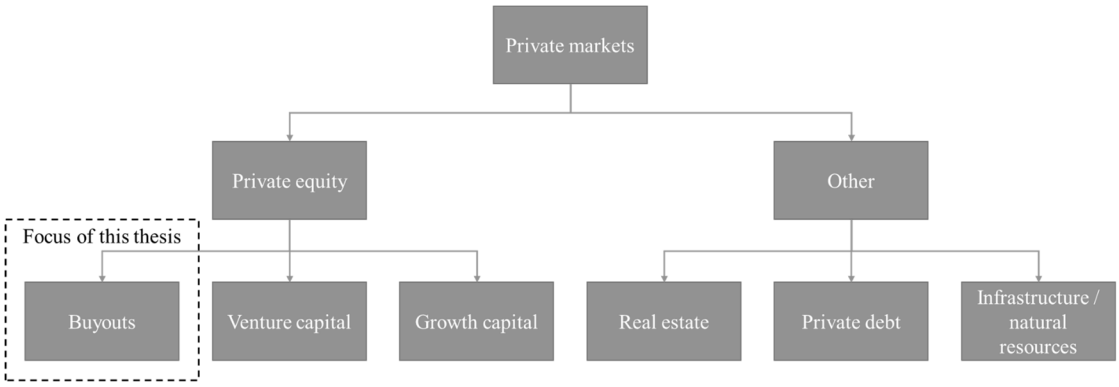

Figure 2: Types of private markets and private equity. Based on McKinsey & Company (2018).

Moreover, as the US is geographically the biggest market in buyout funds, and private equity in general, most of the academic research regarding private equity has focused on US-based private equity firms. Certainly, the most data is also available from the US private equity market. However, to provide a distinct contribution, and to narrow down the scope to more closer-by regions, this thesis focuses on European private equity firms and their funds.

1.4 Structure

The thesis is organized into five chapters as follows. The next chapter consists of the theoretical part of this study. It is divided into an introduction to private equity, in particular leveraged buyouts, followed by a review on cross-border private equity and its challenges and opportunities. In addition, the existing private equity fund performance literature is reviewed. The next part of the chapter synthesizes the literature review and the hypotheses are then formed based on the findings in the theoretical part.

Chapter 3 starts the empirical part by introducing the data and the data sourcing process. Next, the dependent, independent and control variables are described. Finally, the methods used in the analysis are explained. Chapter 4 provides the results of the analysis divided into descriptive and regression analysis parts. Finally, Chapter 5 concludes by discussing the results, the reliability and validity of the study as well as limitations, and provides ideas for future research.

2 Literature review and theoretical background

2.1 Private equity overview

2.1.1 Introduction to private markets

Private equity, as the name suggests, is an asset class and part of private markets where capital is not publicly listed but rather comes from private entities and investors. It is also categorized as an alternative investment due to the differences in complexity and regulations with more ordinary classes such as stocks and bonds. The investment targets, most often companies, can either be private or public and offer potential for growth, and therefore enable value creation for the owners. The investment to private equity often comes from institutional investors, such as pension funds, and other accredited investors, such as high net worth individuals, who are able to commit substantial amounts of capital for long-enough times for the investment to be effective.

Private equity as a term refers to a broader asset class, which includes different sub-forms. The general definition presented in chapter 1.3.3 first divides private markets into private equity and other private markets, and private equity further into buyouts, venture capital and growth capital. Buyouts, often also called as leveraged buyouts, refer to private equity investments where a company is completely – or majority of it is – acquired in order to develop it and eventually sell it with a profit. The financing of leveraged buyouts involves a heavy amount of debt. Buyouts are discussed further in chapter 2.1.2.

Venture capital is a form of private equity where investment targets are startups or early stage companies that need funds to support their growth or to enter a market. It differs significantly from buyouts in that venture capital investors often make minority investments and take a more passive role as well as in that there is more risk and uncertainty involved due to the immaturity of the target companies. Further, growth capital is an investment to an already mature company that needs capital often to fund a transformational or otherwise significant event and is unable to obtain the financing from elsewhere. Similar to venture capital, growth capital investments are often minority investments (Stowell, 2012). Another form that is often distinguished is distressed private equity, which focuses on investing into financially stressed companies.

Other private markets investments include real estate, which consists of pooled investments into properties, often commercial buildings, and private debt, consisting of lending in the form of senior, subordinated or mezzanine debt. Furthermore, there are funds dedicated to investing into infrastructure assets as well as natural resources. In 2017, buyouts, venture capital and growth capital represented about a half of the total private markets' assets under management globally, while buyouts clearly dominated in the developed economic areas, as shown in Figure 3.

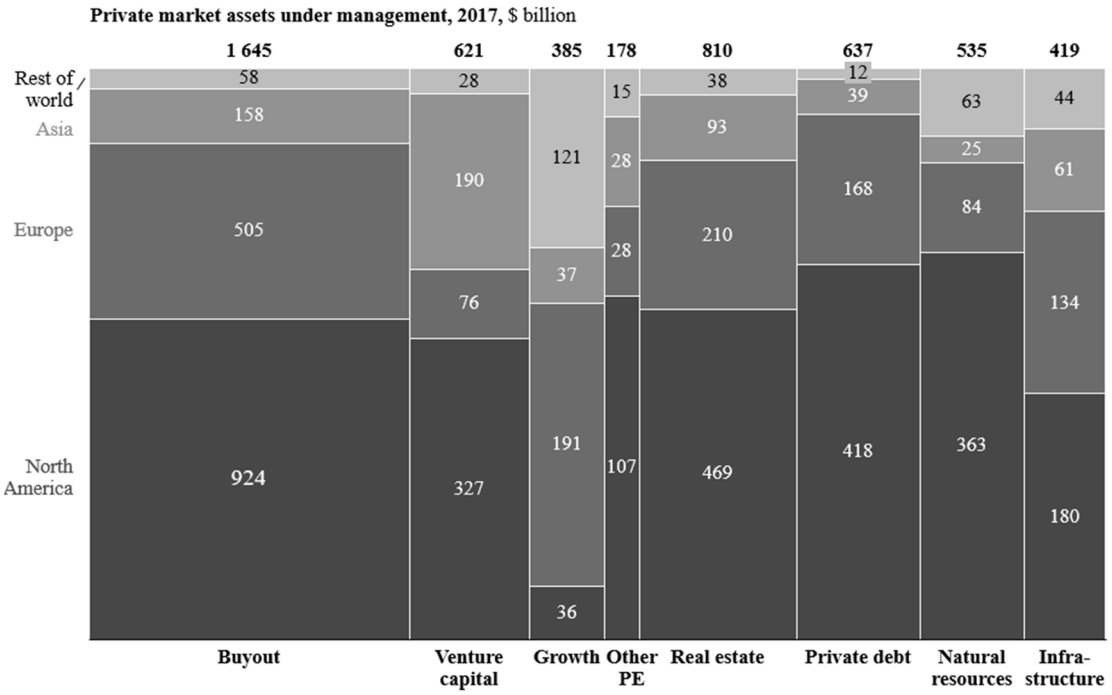

Figure 3: Global private market assets under management (McKinsey & Company, 2018).

2.1.2 Leveraged buyouts and private equity

As introduced in chapter 2.1.1, leveraged buyouts are majority investments executed by private equity firms and that are financed with a relatively high amount of debt and small amount of equity. In literature, and in general business terminology, terms buyouts and leveraged buyouts often refer to the same thing. Moreover, private equity is often associated with a practice carrying out leveraged buyouts and distinguished from, for example, venture capital, and the terms private equity and leveraged buyouts are also used interchangeably (Kaplan & Strömberg, 2009). Therefore, for the purposes of this thesis and from this point onward, private equity is a term referring to leveraged buyout practice.

The investments in private equity are carried out through a private equity fund, which is structured as a limited partnership and usually has a fixed lifespan of approximately 10

years with possible extensions (Kaplan & Strömberg, 2009). The limited partnership is formed between the private equity firm, which is the general partner and manages the fund and the investments, and the investors, who are the limited partners and commit capital to the fund. Often also, the general partner invests at least 1 % into its funds (Kaplan & Strömberg, 2009). In 2017, pension funds were the most active investors providing 29 % of all capital raised in European private equity, while funds of funds totaled 20 %, family offices and private individuals 15 %, sovereign wealth funds 9 %, and insurance companies 8 % (Invest Europe, 2017). Figure 4 illustrates the private equity fund's stakeholder relationships.

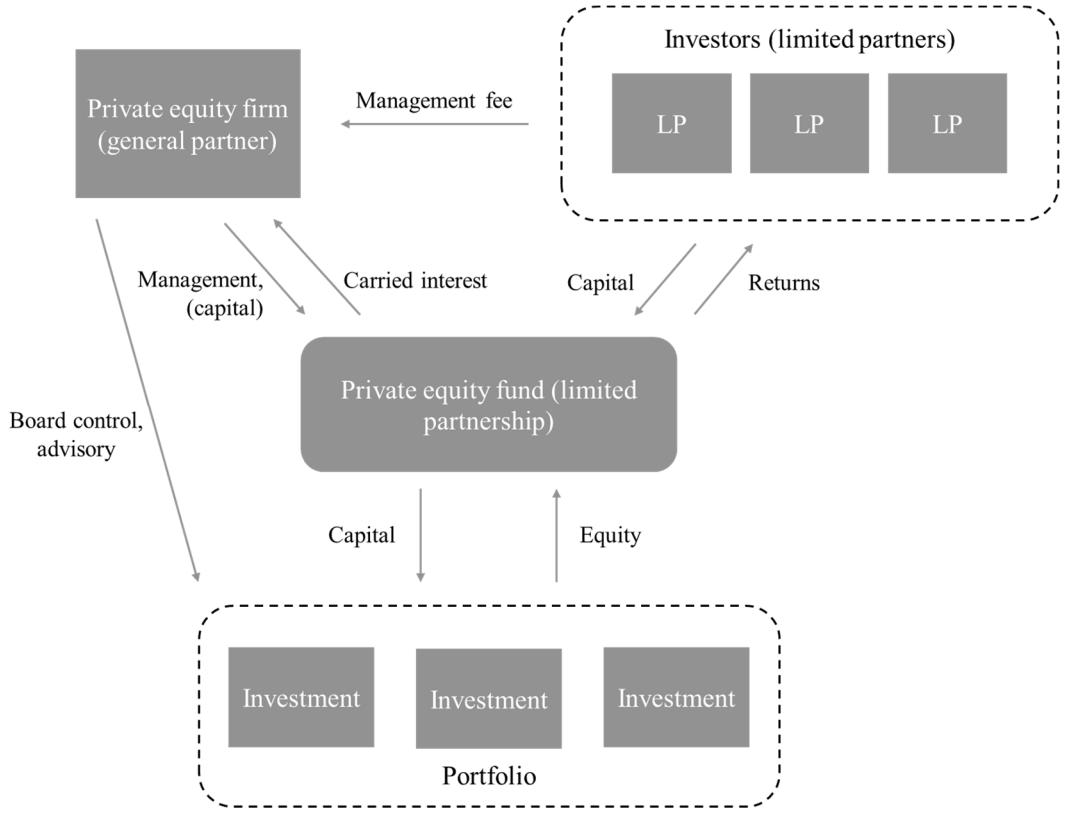

Figure 4: Private equity fund stakeholders and their relationships

According to Jensen (1989), private equity firms are characterized by a lean, efficient organization that has very little overhead and employ relatively few people. With other productive structures, such as effective incentives of the investment managers, Jensen argued that private equity would be a superior organizational form in relation to traditional public corporations. Although private equity firms have grown in headcount and in what kind of talent they look for, a typical investment professional still has a background in investment banking or management consulting. Figure 5 shows the development in the number of firms in the global private equity market.

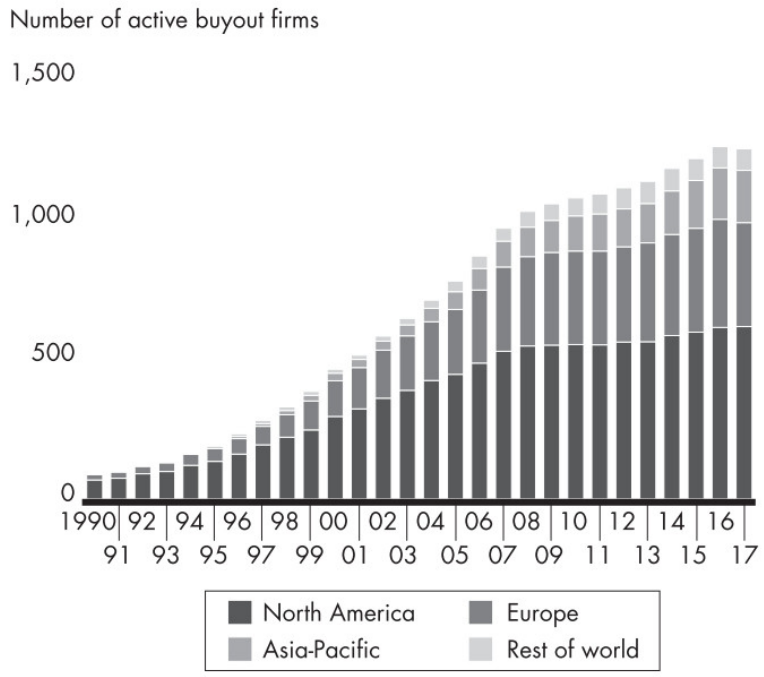

Figure 5: The number of private equity firms globally (MacArthur et al., 2018).

The private equity firm is responsible for selecting the target companies to be bought, usually with the help of advisors, such as an investment bank and strategy consultants, negotiating the purchase price and securing the debt financing. Typically, the firm has five years to invest the fund's capital and subsequently up to eight years to return the capital to the investors (Kaplan & Strömberg, 2009). In addition, particularly in the case of buyouts, the private equity firm manages the target company's operations and decision-making by making changes to the company's management if needed, and by the controlling position in the company's board of directors (Kaplan & Strömberg, 2009). Finally, the private equity firm is responsible for selling the company, and therefore closing the investment (Stowell, 2012).

On the other hand, the role of the fund's investors is significantly more passive and is, to a large extent, limited to committing the capital to be invested. After the commitment, they cannot affect the use of the funds, assuming the fund agreement, including covenants on investment size restrictions, portfolio company characteristics and fund economics, is obeyed (Kaplan & Strömberg, 2009). Although the capital is locked to a period of up to 10 to 12 years, cash is usually returned to the investors as investments are sold. Also, rather than providing the whole sums up front, the limited partners commit a certain amount in the beginning, from which the general partner then draws as investment opportunities emerge (Stowell, 2012).

The capital flows, or revenue, for the general partner in a private equity investment scheme consist of fixed fees, performance-based fees that vary based on the fund returns, and investment costs (Metrick & Yasuda, 2010; Stowell, 2012). Firstly, the manager reward consists of an annual payment called the management fee, which is paid by the limited partners to the fund managers as a compensation for the investing and management operations. This fee is usually around 2 % of the total capital commitments made to the fund in question (Metrick & Yasuda, 2010).

Secondly, part of the returns of the fund is allocated to the private equity firm to incentivize the managers to seek for excessive, above public market profits. These returns are called carried interest and they are usually subject to the fund exceeding a certain hurdle rate, for example 8 %. This performance fee is taken from the fund returns exceeding the hurdle rate and is usually around 20 % of the total profit (Metrick & Yasuda, 2010). Furthermore, transaction and monitoring costs are usually charged and are split between the general partner and the limited partners, with the general partner often receiving a larger share of the proceeds.

2.1.3 Private equity investment characteristics

Fund lifecycle and fundraising

The lifespan of a private equity fund involves multiple phases of different activities creating the fund's lifecycle (Kaplan & Strömberg, 2009; Winkelman, 2018). First, a couple of years is spent in raising the funds from the investors. This period usually lasts for one to two-or-so years. Second, after some funds have been secured the firm starts looking into investment opportunities while still raising the final funds. This sourcing and closure of investments lasts from two to five or more years. In parallel with looking into the opportunities, the private equity firm manages and improves the portfolio companies for a period of three to eight plus years. Finally, the private equity firm looks to exit the investments and return the capital to the investors. Due to the lifecycle profile of a fund, the cash flows of the fund typically follow a J-curve in shape as the pattern in the beginning has net cash outflow and net cash inflows in the later years (Gilligan & Wright, 2014).

If a private equity firm is successful, it continues business by raising a new fund usually every three to five years. In the recent years, there has been a decreasing trend in

fundraising cycles with the average time between predecessor and successor fund closures decreasing by 10 months from 2013 to a level of 42 months in 2018 (Feliz, 2018). On the other hand, the lifespans of the funds have been increasing with median being at 13.2 years in 2014 (Palico, 2015). If the firm has been able to create value for the investors in the previous fund, the subsequent funds' size is often larger leading to larger absolute fees or general partners are able to charge higher fees per dollar under management (Metrick & Yasuda, 2010). Nevertheless, by raising a new fund relatively often, the private equity firm can sustain a guaranteed income stream that is not related to performance (Braun & Schmidt, 2014).

The ability to raise a new fund is largely correlated with the general partners' track record in realizing returns for the investors. Better performing partnerships allow the general partner to raise new and larger funds and poor performance leads to decreasing commitments (Kaplan & Schoar, 2005). Given the relatively short cycle time between fundraising, the general partner needs to balance between the pressure of providing early returns and longer-term value. This might lead to a moral hazard in the partnership, in which the general partners intentionally want to signal the performance prematurely in order to raise a new fund. Therefore, they exit their best investments before they have reached their full potential (Kaplan & Schoar, 2005), and leave the weaker deals to be liquidated after the closing of the follow-on fund. Braun and Schmidt (2014) find that investments exited before the closure of a follow-on fund are larger than those exited after.

Investing phase and value creation

The investing period for the fund involves a careful process of sourcing deals and analyzing the opportunities. Gompers, Kaplan, and Mukharlyamov (2016) found that while sourcing the deals, private equity firms leverage various sources including management, executive network, investment banks, deal brokers, and other private equity firms. According to the authors, most of the deals are sourced via either a process generated by the private equity firms themselves (35.6 %) or by investment banks (33.3 %). The deals generated by certain stakeholders tend to differ in how available they are for other bidders and private equity firms look to invest in those that are proprietary. Furthermore, Gombers et al. (2016) and Schmidt, Steffen, and Szabó (2010) suggest that larger and older private equity firms have higher quality sourcing and more resources

than smaller and younger ones, and are therefore able to take initially more promising deals into their further screening process and are favored for large and high quality target portfolios.

The investment behavior has been found to differ based on certain market conditions and the experience of the fund manager. Favorable investment opportunities in terms of valuations, eased competition and prevailing credit conditions all affect this behavior, while younger funds are often less sensitive to market conditions in the hopes of proving a track record (Ljungqvist, Richardson, & Wolfenzon, 2007). Private equity firms are often experienced in certain industries, and therefore focus most of their investments on a sector they have a successful track record from. It is important for the managers to stay consistent with the funds' objectives so that limited partners can manage the risk and return profiles of their portfolios. Limited partners see that drifting away from the agreed investing style might lead to underperformance and that the fund manager is incompetent (Cumming, Fleming, & Schwienbacher, 2009).

A very important part of a private equity investment is the value-adding or holding period since it greatly affects the fund's performance and how much return is generated for the investors. In this phase, the fund manager aims at increasing the equity value of the company by providing informal advice and access to networks and reputational capital, and participates in strategic decision-making, which enables restructurings (Schmidt et al., 2010). Historically, the average holding period of an investment has been little over four years (Jenkinson & Sousa, 2015) but after the financial crisis, this has increased to almost six years due to changes in exit markets, longer-term value-creation mechanisms and increased private equity competition (Mäkiaho & Torstila, 2017).

The most important types of value creation during the holding period are revenue growth, improved incentives, improved corporate governance, cost reductions and changes in the management team (Gompers et al., 2016). Smaller companies achieve value through revenue growth, as they have more room to grow, whereas bigger companies rely more on increased margin (Achleitner, Braun, Engel, Figge, & Tappeiner, 2010; Gompers et al., 2016). Achleitner et al. (2010) find that overall, operational value creation has a greater effect on total value creation than financial structuring and revenue growth has three times the effect of margin expansion in EBITDA (earnings before interest, taxes,

depreciation and amortization) improvement. Value creation is discussed more in chapter 2.3.1.

Private equity transactions

A leveraged buyout transaction involves a private equity firm purchasing a company or a business unit, from either the public or the private market. In case of a public-to-private buyout, the private equity firm normally ends up paying a 15 – 50 % premium on the pre-offer stock price of the target company (Bargeron, Schlingemann, Stulz, & Zutter, 2008; Kaplan, 1989). The purchase price is the enterprise value of the company, defined as the market value of the company plus the book value of the company's debt subtracted by the amount of cash. The enterprise value is often measured with a multiple ratio to EBITDA. These multiples have recently hit all-time highs with an average US-based leverage buyout purchase price to EBITDA multiple rising from 7.7 in 2009 to 11.2 in Q3/2017 (MacArthur et al., 2018).

The purchase price is financed with a combination of debt and equity. The debt portion is usually somewhere between 60 to 90 %, and most typically, the equity share has been found to represent only 25 % in large, at least $1 billion, buyouts (Axelson, Jenkinson, Strömberg, & Weisbach, 2013). The debt usually consists of senior loan provided by a bank or an investment bank and more junior type of loans, i.e. high-yield bonds or mezzanine loan (Kaplan & Strömberg, 2009). The remaining 10 to 40 % of the financing is equity, which is drawn by the general partner from the capital commitments made by the investors into the fund. To align the target company's management's – which is either new or the same as pre-transaction – interests with those of the new owners', the management team usually provides a minor share into the equity part as well (Kaplan & Strömberg, 2009).

In practice, private equity deals are structured through a chain of holding companies, as illustrated in Figure 6, with new set of companies set up for each investment. In a simple model, the private equity firm creates a new holding company, which will hold the shares of the target company. The private equity fund and the management of the operating company will own the equity in the holding company. The fund will provide capital and lenders will provide debt to the holding capital, which will then buy the shares in the target company. In a more complex model, multiple new companies will be created so that different lenders have an own company they borrow money to, in accordance with

the subordination hierarchy of the loans. Therefore, the shares of target company are held in the holding company on the highest level. In addition to the subordination hierarchy, having multiple companies may, in some cases, imply tax benefits (Blomberg, 2008; Deloitte, 2017).

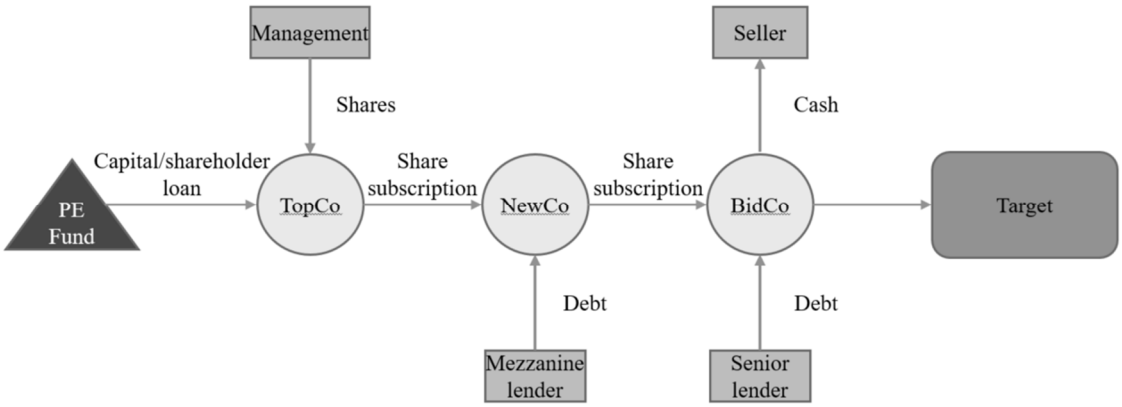

Figure 6: Example private equity deal structure. Based on Deloitte (2017).

Divestment phase and exit routes

From the private equity firm perspective, the divestment phase of an investment is the most important part in the lifecycle of the fund and the opportunities for possible exits need to be considered already when the investment is made. Private equity funds have a finite contractual lifetime and a successful exit is the only way for the fund manager to liquidate the drawn funds, realize profits and return capital to the investors of the fund (Kaplan & Strömberg, 2009). A sophisticated fund manager also has the ability to differentiate between potentially worthy investments and unsuccessful ones, and quickly writes off those that turn out non-performing (Schmidt et al., 2010).

The exit decision, namely what exit vehicle to use and when to exit, is often a complex process and depends on various factors that can also change over time (Schmidt et al., 2010). In addition to the price of the sale, factors like market conditions, fund characteristics, and portfolio company characteristics need to be considered (Jenkinson & Sousa, 2015; Schmidt et al., 2010). Jenkinson and Sousa (2015) suggest that reputation and age of the investment have an effect on exit route since fund managers are pressured to realize returns early enough in order to facilitate fundraising. The exit decision is also dependent on the size of the private equity firm and especially the size of the investment (Gompers et al., 2016). Both Jenkinson and Sousa, and Gompers et al. (2016) find that market conditions play a critical role in the exit decision-making regarding timing and

route, while Gombers et al. find that achieving the operational plan of the target company as well management's opinion are expected to be important determinants of exit timing.

The exit routes can generally be divided into three categories as suggested by Jenkinson and Sousa (2015): initial public offerings (IPOs), trade sales, and secondary sales. Figure 7 shows the development of the values and volume of global private equity exits by exit route. Historically, trade sales or sales to strategic buyers has been the most common exit route, followed by secondary sales and IPOs. Surprisingly, the most focus in existing literature has been put on IPOs as exit routes, while in fact they are relatively uncommon. Papers by, for example, Gompers et al. (2016), Kaplan and Strömberg (2009), Schmidt et al. (2010), and Strömberg (2008) all document that trade sales represent about 40 to 50 %, secondary sales 20 to 30 %, and IPOs 15 to 20 % of the chosen exit routes.

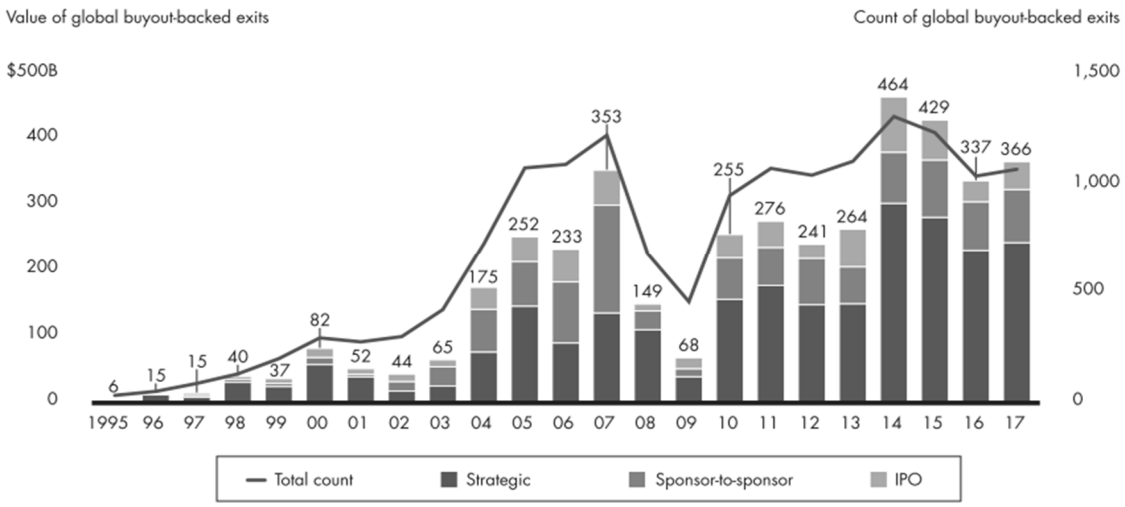

Figure 7: Private equity exit value and volume by type (MacArthur et al., 2018).

An IPO is an exit strategy where the portfolio company is first listed on a public stock exchange and the private equity company thereafter sells its shares in the market. Schmidt et al. (2010) mention that IPOs are generally done by companies that have a strong equity story or growth potential, and that they should thus become more rare with mature companies, which is a group private equity firms target. Schmidt et al. (2010) also find evidence to a widely documented phenomenon that IPOs are associated with better returns than other types of exit vehicles. They argue that this is an artifact of private equity companies taking the best performing investments public. In addition, and supporting the argument of the connection between profitability and buyout-backed IPOs, private equity

firms want to exit the investments via an IPO early rather than late due to the popularity and marketing effects (Jenkinson & Sousa, 2015).

Moreover, stock market conditions are found to influence the decision for private equity firms to take their portfolio companies public. If the industry is going through a boom and valuations are high, private equity funds can realize excessive returns compared to other exit strategies, and therefore prefer the route (Jenkinson & Sousa, 2015; Schmidt et al., 2010). Good liquidity in the stock market is also favorable because the fund needs to be able to sell substantial stakes.

Trade sales, most commonly, refer to an exit strategy where the private equity firm sells a portfolio company in a private market so that the acquirer is an operating company, usually a competitor working in the same market or a company wanting to expand its offering. Such acquirer is often called a strategic buyer due to the aim of realizing synergies through the acquisition. They represent the most common exit route for private equity investments. Strategic buyers usually look to make long-term combined improvements, and are therefore less sensitive for macroeconomic and industrial conditions (Holloway et al., 2016; Jenkinson & Sousa, 2015).

Since trade sales often involve synergies, the purchasing price should theoretically be higher than in other types of exits as the synergies are modeled into the valuation. However, as private equity firms face pressure to realize investments towards the end of a fund's life, and as the preferred exit route for the best performing investments is through an IPO, firms might have to settle for lower prices in trade sales (Jenkinson & Sousa, 2015; Masulis & Nahata, 2011). Furthermore, trade sales are more likely for smaller companies and in case of a very large deal, there might not be a large enough strategic buyer to sell to (Gompers et al., 2016; Jenkinson & Sousa, 2015).

The third common exit strategy for private equity investments is sales to another financial sponsor, also known as secondary buyouts or sponsor-to-sponsor sales. In a secondary buyout, the buyer is another private equity firm and is called a financial buyer because unlike strategic buyers, they are interested in the financial returns available from the investment rather than the strategic fit of the company. Secondary sales account for around 20 to 30 % of all types of exits and the figure has increased over time (Kaplan & Strömberg, 2009). Investments exited via secondary sales are characterized by longer

holding periods than trade sales and IPOs and offer liquidity for private equity funds that have investments that are not yet ready for an IPO (Gompers et al., 2016). Secondary buyouts considered, a typical leverage buyout remains in private equity ownership nine years after the initial transaction (Strömberg, 2008).

Since the buyer in secondary sales is a private equity firm, and therefore uses a lot of debt for financing the investment, market conditions, such credit conditions or the pricing on the public market, have a significant impact on secondary sales activity (Jenkinson & Sousa, 2015). For example, secondary buyout activity was extremely high before the financial crisis, which was driven by the loose debt market conditions and available funds (Shivdasani & Wang, 2011). In addition, the availability of debt affects the prices in buyout deals, as the use of higher leverage allows the buyer to pay higher. This, together with high levels of capital committed shifting demand, make secondary deals an attractive exit strategy (Axelson et al., 2013; Jenkinson & Sousa, 2015). Given the current record-high levels of dry powder, we could be facing another secondary buyout boom.

2.2 Cross-border private equity investments

2.2.1 Internationalization of private equity

Similar to the overall private equity market, international activity has been significantly increasing during the past decades. As the most sophisticated country in financial equity markets, the US has historically been – and still is – the most active area for private equity professionals and investments. However, during the last ten years the rest of the world has been catching up. The number of buyout firms in Europe, Asia and other countries has grown faster than in the US (see Figure 5 in chapter 2.1.2) and, for example, the value of buyout-backed public offerings in Europe has exceeded the value of those in the US in the past few years (MacArthur et al., 2018). This suggests that the rest of the world, and especially Europe, provide competitive financial markets although large heterogeneity probably exists.

Aizenman and Kendall (2008) argue that the start of the international private equity activity was driven by the general globalization of business and, especially in venture capital, by the 1990s' IT bubble that directed excessive funds to the US and led venture capital investors to search deal flow across borders. While the number of private equity practitioners grew in other developed economies outside the US saturating the market and

tightening the competition, reformations in regulation made developing countries more favorable investment destinations (Wright et al., 2005). In buyouts, asset management is heavily concentrated to the US and Europe, while most of the assets under management in Asia and rest of the world are in venture and growth capital (see Figure 3 in chapter 2.1.1). This suggests that large-scale buyout activity and expertise has yet to beach to developing countries. On the other hand, the lack of investor supply in countries can bring in foreign investors, which can stimulate their domestic markets as investors help the portfolio companies to internationalize, especially to their home locations (Mäkelä & Maula, 2005).

These factors have driven international private equity inflows and outflows to grow outside the US and cross-border private equity deal volumes have been on the rise. In Europe, since 1988, the share of foreign sources of fundraising to private equity funds more than doubled to 45 % in 2003, while the share of cross-border invested amounts almost fourfolded to 29 % (EVCA, 2008). Overall, the share of private equity deals with cross-border participation between early 1990s and late 2000s has grown from 15 % to 40 % (Aizenman & Kendall, 2008). The significant difference between the US and elsewhere is that in Europe and Asia, half of new funds raised come from non-domestic sources while in the US the share is 10 % with similar numbers for the funding of deals (Aizenman & Kendall, 2008; Wright, Pruthi, & Lockett, 2005).

2.2.2 Cross-border private equity investing nature and challenges

As essentially a knowledge driven business, private equity has certain differences with other types of industries that make it distinct and that are particularly interesting in a cross-border context. The business environments in different countries are heterogeneous and the required knowledge and resources by a firm to run business outside their home country are different from that of their domestic market (Dunning, 1993; Johanson & Vahlne, 1977). This is also true for the private equity environment, as the industry comprises multiple fields, such as financial, legal, strategic, and operational, which all have their own characteristics that may vary geographically, and therefore require specialist skills from private equity practitioners (Wright et al., 2005). Therefore, the activities private equity firms engage in during the lifecycle of the fund discussed in chapter 2.1.3 create challenges for the firm in international settings (Meuleman & Wright, 2011).

Firstly, challenges are posed in the sourcing and selection phase of potential investments. In general, information asymmetries are a problem when it comes to venture capital investments, as there is often not much information available of companies that are non-established or might not have a working business model. Although later stage buyouts usually involve targets that are more mature, and therefore have more information available of, the cross-border setting exacerbates the phenomenon of problematic deal identification (Wright et al., 2005). Moreover, the local institutional environment of the target might not be sufficiently familiar or relevant for effective deal generation and screening.

Secondly, possible challenges in cross-border investments are also involved with the managing and value-adding phase. The monitoring phase might require visits to the local operational premises (Gorman & Sahlman, 1989) and some of the value-adding activities, such as controlling the board or replacing management (Gompers et al., 2016; Kaplan & Strömberg, 2009) require flexibility and coverage from the private equity firm and its networks. In particular, when the private equity firm does not have prior experience from the local market, the importance of picking the right management, in case of management replacement, is emphasized.

Consequently, the cost of managing and monitoring the portfolio companies increases with geographical distance (Sorenson & Stuart, 2001). Distance has been found to be negatively related to cross-border deal volume suggesting that strong location bias is involved with cross-border investing (Aizenman & Kendall, 2008). Naturally, intensive monitoring and advisory generate travel costs when the portfolio company is in a distant location. The geographical distance is a decisive factor for investment decisions due to the direct as well as indirect costs, and therefore discourages private equity capital flows (Tykvová & Schertler, 2014). According to Aizenman and Kendall (2008), distance can be considered as proxy for the lack of local information, social and business networks, and the difference in institutional environment. Indeed, especially in Europe, the legal, tax and operating environments are set on the country-level, which means the knowledge of the private equity firm may not be sufficient, and therefore the advisory role of the general partner might become less valuable (Meuleman & Wright, 2011).

The nature of the local private equity landscape and the competitive environment also affect the investing behavior and opportunities of a foreign private equity firm. If the local

private equity market is less developed and only few experienced local private equity firms exist, there might not be too many opportunities to tackle the challenges in the local market by collaborating with local firms (Jääskeläinen & Maula, 2014). Private equity firms often syndicate with firms of similar prominence (Du, 2009; Lerner, 1994; Officer, Ozbas, & Sensoy, 2010).

On the other hand, if the local private equity market is well developed, the high number of local firms may offer better opportunities for foreign players to find collaboration partners. However, these local firms might not be willing to collaborate due to the better experience and investing capability they possess and the pool of possible local syndicates that might be less risky (Meuleman & Wright, 2011). Syndicated leveraged buyouts are more likely to happen between domestic partners than between cross-border firms (Cao et al., 2014). Further, a growing private equity market also means a more competitive interdependence between its members (Baum & Singh, 1994) and make local firms less willing to collaborate with foreign firms. Meuleman and Wright (2011) find that the likelihood of a cross-border deal to be syndicated decreases when the number of local private equity firms grow too high.

2.2.3 Cross-border private equity investing opportunities and challenge remedies

Institutional environment

One key aspect regarding cross-border private equity activity is the institutional environment of a participating country. In a leveraged buyout, the private equity fund has two primary agency relationships: one with the manager or the shareholders of the target company and another with the bank providing the loan financing in a deal. Both of these agencies have their own legal conditions and rights that might differ by country, and as sophisticated participants, the private equity firms can have the ability to overcome the limitations of a weaker environment. In venture capital context, prior research has found that legal conditions affect the success of the investors and that experienced investors are able to negotiate effective contracts also in countries with weaker legal regime (Kaplan, Martel, & Strömberg, 2007; Lerner & Schoar, 2005; Nahata, Hazarika, & Tandon, 2014). Institutional factors also influence how a firm's local resources affect performance. Having local experience is most valuable in countries where contracting institutions are weak (Taussig & Delios, 2015).

A first important institutional environment factor is creditor rights. Countries with strong creditor rights have better developed credit markets (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998), which positively affects the availability and the cost of debt financing. Therefore, buyout volumes and values are larger in countries with strong creditor rights (Cao et al., 2014). Consequently, Ljungqvist et al. (2007) and Axelson et al. (2013) find that cost of credit is a key determinant in investment decision-making as well as pricing of deals, both in the US and internationally, which also affects the returns. In addition, Cao et al. (2014) find that in cross-border leveraged buyouts the investments come from countries with stronger creditor rights to countries with weaker creditor rights further supporting the notion that countries with weak credit markets struggle in deal facilitation and require foreign participation with better access to financing.

The legal environment for borrowers also affects the deal valuations and premiums paid to shareholders. Axelson et al. (2013) find that when credit conditions are favorable, private equity investors use extensive leverage to finance deals leading to overly high pricing and decreased returns. On the contrary, Cao et al. (2014) find that the premiums paid are smaller in countries with strong creditor rights and argue that strong creditors have the ability to apply restrictive covenants on borrowers, therefore limiting their value-adding opportunities. In addition to creditor rights, legal shareholder and investor protection has an increasing impact on valuations and returns (La Porta, Lopez-De-Silanes, Shleifer, & Vishny, 2002; Lerner & Schoar, 2005). Furthermore, Cao et al. (2014) find that strong shareholder protection is associated with less cross-border deals and higher premiums suggesting that, creditor rights considered, private equity firms are looking across borders in search of cheap deals.

Another factor regarding the institutional environment affecting cross-border investments is the advisory spectrum in the local market. Especially investment bankers play a crucial role in the deal generation and screening phase since they can significantly influence the deal flow where the private equity firm can draw opportunities. According to Gompers et al. (2016), one third of deals sourced are investment banking generated. The difficulties aroused by information asymmetry and otherwise problematic deal selection can be alleviated by a developed local investment banking industry.

In addition to providing access to deal flow, local investment banks can help with other peculiarities that are related to, for example, the valuation of targets or the negotiations

and bidding, as information used, processes and methods vary by country (Kosnik & Shapiro, 1997; Manigart et al., 2000). Meuleman and Wright (2011) find that cross-border investments are less likely to be syndicated in the presence of a well-developed investment banking market suggesting that foreign firms do not need to resort on other connections as much when favorable professional advisory is available. In general, accessing external local resources might be challenging as the liability of being foreign grows with the idiosyncrasies of the local market. In this case, firms can turn to global markets for external resources toward which foreignness can be an asset (Taussig, 2017).

Cross-border club deals

The information asymmetries between the private equity firms and the potential targets pose difficulties for successful private equity practice and these challenges might be amplified in a cross-border setting (Wright et al., 2005). When investing in a foreign market, firms improve their knowledge and resource base required to address these challenges by entering into alliances (Hitt, Dacin, Levitas, Arregle, & Borza, 2000). In a private equity context, such alliance often means syndication. In a syndicated deal, or a club deal, two or more private equity firms jointly sponsor a leveraged buyout (Officer et al., 2010). In a cross-border private equity club deal, local sponsors partner up with foreign sponsors to invest in the target (Meuleman & Wright, 2011). Knowledge obtained in one country about the business and institutional environment might be insufficient or not applicable in another. Therefore, private equity firms can gain knowledge by syndicating with local firms (Bruton, Fried, & Manigart, 2005).

As teaming up with local firms can unlock valuable information about the target's market, the ability and need for foreign private equity firms to rely on local syndicates is also affected by, and depends on, the development of the institutional environment. The experience and prominence of the local private equity firms influence the extent to which foreign private equity investors can use them as partners and effectively work on deals (Officer et al., 2010). In a weakly developed private equity market, there is not too many firms to team up with (Jääskeläinen & Maula, 2014) and up to a certain point, the likelihood of cross-border syndication grows with the number of local private equity firms (Meuleman & Wright, 2011).

Syndicating with local private equity firms can help to tackle the idiosyncrasies of a weak institutional environment (Bruton et al., 2005). For example, the aforementioned effects

of creditor rights can be facilitated with syndication. This is because syndication can allow overcoming capital restrictions, enable a more diversified portfolio and also provide access to more favorable debt conditions (Cao et al., 2014). Consequently, Cao et al. (2014) find that syndicated deals are more probable in countries with weaker creditor rights, which is supportive to the assumption that obtaining favorable credit is difficult in such countries. Furthermore, the ability to overcome capital constraints and better access to debt also allow private equity firms to target bigger companies and larger deal values have been found to be more likely among club deals (Cao et al., 2014).

On the other hand, there may also be motives for the local private equity firms to syndicate with foreign firms. In a less developed private equity market, local firms look to syndicate with foreign firm to gain experience and knowledge on foreign markets (Jääskeläinen & Maula, 2014). In a developed market, it may be difficult for foreign firms to find syndicate partners due to the more extensive knowledge of the local firms and the greater number of local firms with whom to syndicate. In this case, the motive to syndicate with a foreign firm can rise from diversification (Manigart et al., 2006) or from strong sector specialization and know-how of the syndicate firm (Cressy, Munari, & Malipiero, 2007; Gompers, Kovner, & Lerner, 2009). In addition, a local firm can choose to syndicate with a foreign firm in order for it to support the internationalization strategy of the portfolio company (Mäkelä & Maula, 2005).

Private equity firm experience

A private equity firm's prior international experience and experience in the host country of the potential target can also affect its investing behavior. For a business, internationalization can be seen as a process of learning and gaining and building on knowledge (Johanson & Vahlne, 1977). This is because the firm learns about the specific market and is therefore able to reduce institutional and other challenges posed by the foreign market. By operating in a foreign market, firms acquire business, institutional and internationalization knowledge, derived from the prior investment activity in the market, which they can capitalize on in the evaluation, selection, and management processes of investments (Meuleman & Wright, 2011).

In addition to country-specific knowledge creation, multinational experience, i.e. experience in different countries, is also important for a firm's internationalization process (Johanson & Vahlne, 1977). The diverse set of environments with different

institutional characteristics and the large variety of stakeholders the firm has to interact with add on the knowledge development of the firm (Barkema & Vermeulen, 1998). The richer the knowledge set, the more likely is that the firm can benefit from the experience in following international investment situation (Meuleman & Wright, 2011).

The accumulated country-specific and multinational knowledge might also allow the firm to be less dependent on local partners (Liu & Maula, 2016). This implies that syndication is more useful in the early stages of internationalization when the local market is unfamiliar for the firm (Guillén, 2003). In fact, once local knowledge has been acquired, firms might prefer to invest alone since syndication may expose the firm to various agency costs and the benefits of cross-border syndication might start to be outweighed by the costs (Meuleman, Wright, Manigart, & Lockett, 2009). Meuleman and Wright (2011) find that the probability for a cross-border deal to be syndicated decreases as the country-specific or multinational experience of the firm grows.

Local offices

One strategy suggested by literature for overcoming challenges related to distance in cross-border investing is establishing local branches. Private equity firms have been found to perform better and increase deal flow after opening a branch (Holloway et al., 2016). In a venture capital setting, Li, Vertinsky, & Li (2014) find better probability for exit success when the firm has a local presence. Having a local branch allows for the firm to be closer to the market and the portfolio company, making it possible to provide improved support and monitoring (Hammer, Mettner, Schweizer, & Trombley, 2018; Meuleman & Wright, 2011). In addition, the costs related to these activities as well as identifying targets are reduced when work can be done closer to the portfolio firm than from arm's length (Kaplan & Strömberg, 2009; Tykvová & Schertler, 2014).

Having a local office, and learning about the local business and institutional context, can add to the direct knowledge gained from doing repeated deals in a country (Liu & Maula, 2016) by expanding firms absorptive capacity (Levinthal & March, 1993). This way firms can accrue knowledge about the local context much faster than, for example, through syndication which can also be costly (Meuleman et al., 2009). The local presence can help the firm be more recognized in the market by helping in building networks and trust (Hosmer, 2011; Oliver, 1997), which is important if the firm wants to generate proprietary deals (Gompers et al., 2016). Furthermore, the local branch helps in mitigating

information asymmetries (Pruthi, Wright, & Meyer, 2009). Recruiting local professionals to the branch reduces cultural and institutional differences and improves knowledge transfer and communication with the portfolio company (Prijcker, Manigart, Wright, & Maeseneire, 2009; Pruthi et al., 2009).

Table 1 summarizes the previous literature related to cross-border and international private equity.

Table 1: Cross-border and international private equity literature

Authors	Research area	Findings
Aizenman & Kendall (2008)	Internationalization of private equity	Geographical and cultural distance affect deal flow
Bruton et al. (2005)	International venture capital	VCs subject to different institutional forces in different countries affecting their behavior
Cao et al. (2014)	Cross-border buyouts	Cross-border buyouts flow from countries with strong creditor rights to those with weak rights
Hammer et al. (2018)	Cross-border buyouts	Local offices mitigate the negative effects of cultural distance on buyout performance
Holloway et al. (2016)	Cross-border buyouts	One standard deviation increase in IRR associated with doubling of deals in a country
Kaplan et al. (2007)	International venture capital	US style contracts are most efficient for VC success
Lerner & Schoar (2005)	International private equity	Deals in countries with high legal enforcement have higher valuations and returns
Li et al. (2014)	Cross-border venture capital	International experience mediates the negative effects of institutional distance
Meuleman & Wright (2011)	Cross-border buyouts	Institutional context and organizational learning related to the use of syndicates
Mäkelä & Maula (2005)	Cross-border venture capital	Foreign venture capitalists valuable when located in the target's market of internationalization
Nahata et al. (2014)	Cross-border venture capital	Legal rights, developed stock market and cultural distance positively affect VC performance
Pruthi et al. (2009)	International venture capital	Recruiting of local executives more important than sending people from headquarter country
Taussig et al. (2015)	Cross-border private equity	Effect of local experience on performance strongest in countries with weak contracting institutions
Tykvová & Schertler (2014)	Cross-border venture capital	Obstacles of great geographical distance can be overcome by syndicating with local VCs
Wright, Pruthi & Locket (2005)	International private equity	Cross-border activity of private equity firms under-researched, especially institutional context
Liu & Maula (2016)	Cross-border venture capital	Venture- and country-level uncertainty distinctly affect syndication

2.3 Private equity fund performance

2.3.1 Value creation in private equity investments

Financial, governance and operational engineering

The performance of a private equity fund is partly achieved through the value-creating actions taken by the fund manager on transaction level. Private equity firms create value to their portfolio companies through three types of actions, as suggested by Kaplan and Strömberg (2009); financial engineering, governance engineering, and operational engineering. These actions are not unique to private equity owned companies but their effective use make them different from public corporations. Improving the portfolio company allows for better operating performance, which increases the value of the company, and therefore directly affects the returns of the investment for the fund.

In Kaplan and Strömberg's classification, financial engineering mainly relates to incentivized and motivated management. First, the equity ownerships of the management are significantly larger for private equity backed companies than for public companies suggesting that private equity firms use ownership stakes as a key driver for motivating and dedicating management (Kaplan, 1989; Kaplan & Strömberg, 2009). Moreover, the management of the company is often required to invest into the company as part of the deal putting their own money at risk if the company fails to perform, while short-term gains are impossible due to illiquid nature of a private company.

Second, the substantial amounts of leverage involved in financing the transaction puts pressure on the management to stay lean in terms of spending, as they are required to use free cash flow to take care of debt-related payments. In comparison, some companies with weak corporate governance in mature industries might misspend their cash flows rather than return them to shareholders (Jensen, 1986). In addition, value can be created through tax shield benefits on interest payments.

With governance engineering, Kaplan and Strömberg (2009) refer to the actions taken by the private equity firm while they control the board of directors of the portfolio companies. The boards of private equity backed companies are smaller and more active in governance compared to those of public companies. On average, private equity firms keep three board seats, give one or two to management and one or two to outsiders (Gompers et al., 2016). In addition, private equity managers easily replace management

if they are unsatisfied with the performance. In fact, Acharya and Kehoe (2008) find that every third chief executive is replaced within the first 100 days after the investment and two thirds within a four year period. Regarding how active private equity firms are in choosing the management teams, Gompers et al. (2016) report that private equity firms usually do not recruit their own management before the investment in hopes of appearing friendly but overall replace senior team more often than not.

Finally, Kaplan and Strömberg (2009) suggest that private equity firms apply operational engineering to their portfolio companies by involving industry and operating expertise to add value to the investments. This means that private equity firms hire also industry professionals with operative experience in addition to the typical transaction specialists, while many also use consultants and other outside advisors. The operating partners – the private equity investment team members with mostly operating experience – are often already involved in identifying sources of value creation pre-investment, whereas the role of consultants, who often carry out the commercial due diligence, is more significant pre- than post-investment (Gompers et al., 2016). In addition to the actions taken in governance engineering, private equity firms expect to create value by crafting the portfolio company's strategy or business model and by changing the CEO, CFO and other management, suggesting they engage in operational engineering (Gompers et al., 2016).

Value creation evidence

Most of the existing literature has associated buyouts with positive operating performance, suggesting that the value-increasing actions taken by the private equity firm described above actually convert into realized improvements. Starting from transactions in 1980s, Kaplan (1989) and Smith (1990) report significant operating performance improvements in public-to-private management buyouts. For example, Kaplan (1989) finds increases in operating income to sales and to assets ratios of 20 % relative to industry and increases in net cash flow of 50 % relative to industry. He and Smith (1990) argue that these effects are due to improved incentives rather than layoffs or insider information. More recently, Cohn and Towery (2013) find operating improvements in private equity buyouts of private firms, while Guo, Hotchkiss, and Song (2011) and Cohn, Mills, and Towery (2014) report only modest operating improvements in leveraged buyouts.

In addition to the accounting performance improvements on portfolio-company level, literature has addressed the real effects related to buyouts, which have again turned out to

be largely positive. Lichtenberg and Siegel (1990) find that leveraged buyouts, especially management buyouts, in the US result in significant increases in total factor productivity of plants after the buyout. They add that employment and wages of overhead workers decline while those of blue-collars remain unchanged. Consistent with this, Harris, Siegel, and Wright (2005) find that the productivity of UK companies substantially increases and that plants involved in the buyouts are less productive than peer plants to start with. This implies that buyout initiators are targeting plants that have productivity improvement potential.

Furthermore, Davis et al. (2014) also document productivity gains in a large set of establishments in US buyouts and find those to be related to divestments of less, and acquisition of highly, productive establishments. Overall, Cumming, Siegel, and Wright (2007), who thoroughly review the governance and returns related literature in private equity and leveraged buyouts, conclude that buyouts increase performance regardless of the measurement approach.

2.3.2 Fund performance measurement

The value created on the portfolio company or transaction level defines the performance of the whole private equity fund. The ability to measure this performance on the fund level is important from both the private equity firm, i.e. the general partner, and the fund investors, i.e. the limited partners, point of views. First, as discussed earlier the general partner's earnings are partly based on the return they can provide for the investors in the form of carried interest (for example Metrick & Yasuda, 2010). Therefore, it is important that the general partner is aware of how their fund is performing currently and how it is projected to perform in the future. In addition, the persistence of returns and the track-record of the general partner affect the fundraising of the partnerships spurring private equity firms to show good performance (Kaplan & Schoar, 2005).

Second, private equity as an asset class is characterized with some unique features, such as irregular timing of cash flow intervals from investors to the fund and back, complicating the tracking of performance. Therefore, limited partners need to be able to somehow measure and benchmark the performance of their investments against other asset classes. Furthermore, when investors compare partnerships there has to be a consistent way of measuring their performances.

Due to the difficulty of pricing the private investments of private equity funds lacking publicly disclosed information, the most typical performance measures rely on the cash flows between the fund and the limited partners. These measures include the internal rate of return (IRR) and the multiple of invested capital (MIC) also known as total value paid in capital. The IRR is the discount rate for which the present value of cash inflows for the investors equal the present value of cash outflows, while the MIC is the ratio of cumulative inflows to cumulative capital outflows. Both measures are reported net of fees. When the fund is still active, and all investments have not been liquidated, the calculations of the returns include the net asset value (NAV) of the residual investments. The formula for the interim IRR calculation, as suggested by Mathonet and Meyer (2005), is as follows:

$$\sum_{i=1}^{n} \frac{CF_i}{(1 + IRR_n)^i} + \frac{NAV_n}{(1 + IRR_n)^n} = 0,$$

where CF_i is the cash flow between the fund and the investors at the end of time period i, n is the number of time periods, NAV_n is the latest net asset value of the fund, and IRR_n is the interim internal rate of return at time n.

The benefit of the IRR and MIC methods is that they allow analyzing investments with irregular and different sizes of cash flows. According to the British Private Equity and Venture Capital Association they are quick and straightforward methods that are easy to interpret. These methods, especially the IRR, are very commonly used, and are recommended by most venture capital and private equity associations. Therefore, the IRR is also used as the performance measure in this thesis. In addition, the IRR is versatile in that it can be separately calculated for each investment the fund makes and is also the most typical method for evaluating investment opportunities (Gompers et al., 2016).

Despite the popularity of the IRR and MIC methods, they both have their weaknesses. Since both metrics provide absolute measures, they do not give any view on how a fund is performing relative to the overall market, and therefore do not control for risks (Kaplan & Sensoy, 2015). To overcome these limitations, a few methods, known as the public market equivalents (PMEs) have been suggested to market-adjust the IRRs and MICs. Firstly, Long and Nickels (1996) propose a method – later called LN PME – that provides a comparison of the IRR of the relevant public benchmark group and the IRR of the

private equity fund. The strength of the LN PME is that the IRR is a familiar metric for many investors, with the downside being that successful early exits skew the fund's performance to be overly positive (Kaplan & Sensoy, 2015).

Secondly, Kaplan and Schoar (2005) propose a similar method for MICs called the Kaplan and Schoar (KS) PME that is the ratio of the sum of discounted distributions to the sum of discounted capital calls, and where the discount rate is the total return of a relevant benchmark group, often the S&P 500 index. In other words, a KS PME greater than one outperforms the benchmark with all fees taken into account. The method is very intuitive although the disadvantage, compared to the IRR, is that it provides a cumulative measure rather than an annualized return (Kaplan & Sensoy, 2015). The KS PME is by far the more commonly used PME metric and is simply referred to as PME hereafter.

One notable question regarding all the metrics is the reporting of interim fund returns, i.e. returns when all the investments are not yet liquidated. In this case, the performance is based on the fund's NAV that is necessarily based on a subjective view of the fund manager. This issue is especially important since, as discussed earlier in chapter 2.1.2, fund performance has a substantial effect on the fundraising capability of the firm and funds have been found to strategically time their exits to boost the returns (Gompers, 1996). Therefore, to facilitate better fundraising, firms, especially those that are underperforming, may be inclined to report inflated NAVs and returns during fundraising. On the other hand, limited partners may be able to see through the manipulation as these firms are able to raise a follow-on fund less often (Brown et al., 2019). Kaplan and Sensoy (2015), who survey related literature, conclude that performance results in existing research are reliable, as it is not clear whether limited partners believe the possibly over-aggressive NAV reporting.

2.3.3 Fund-level performance evidence and drivers

Fund performance evidence

The early evidence of fund-level performance largely culminates around three papers (Kaplan & Schoar, 2005; Ljungqvist & Richardson, 2003; Phalippou & Gottschalg, 2009) written during the 2000s. The time-period of these studies is roughly the same focusing on fund vintages in 1980s and 90s and cash flow data extending to early 2000s. Ljungqvist and Richardson (2003) use cash flow data from one limited partner with a relatively small

sample (73 funds) and estimate that the sample outperforms the equity market. Kaplan and Schoar (2005) use a larger sample of data derived from Venture Economics and find that fund performance approximately equals that of the S&P 500 when measured with PME, with the exception that larger venture capital funds outperform. Phalippou and Gottschalg (2009) use the same data from Venture Economics but write off the funds' NAVs that are over ten years old. With this adjustment, they find that the average PME decreases and conclude that private equity underperforms the public benchmark.

However, later evidence has shown that the results found in the earlier studies might suffer from flaws in data and methodology and that the results might be inaccurate. A notable contribution is Stucke (2011) who finds that the NAVs are not updated in the Venture Economics' data due to voluntary disclosure, and that Kaplan and Schoar (2005) and Phalippou and Gottschalg (2009) both misinterpret the NAVs. By collecting new cash flow and NAV data from actual limited partners, Stucke finds that the NAVs are actually greater than reported and documents significant private equity outperforms in terms of PME. Since then researchers have drifted away from the Venture Economics data and obtained new cash flow-based data to study the performance. The findings from these data imply that private equity buyout funds have outperformed the S&P 500 index by roughly 20 % during the lifespan of the fund (Higson & Stucke, 2012; Phalippou, 2014; Robinson & Sensoy, 2016). Overall, in light of the newer research, it can be concluded that private equity buyout funds have historically outperformed the public markets or at least the S&P 500 in the US.

Fund performance drivers

In their widely cited paper, Kaplan and Schoar (2005) find that returns of a fund are strongly positively associated with the performance of the subsequent fund the general partner raises. Consistent with this, Harris, Jenkinson, Kaplan, and Stucken (2014) confirm these results in their extensive study for funds raised pre-2000. On the contrary, they find only little evidence of persistence for funds post-2000. Furthermore, Robinson & Sensoy (2016) report that performance persistence has remained since Kaplan and Schoar (2005), as their data extends fund vintages to 2009. Kaplan and Sensoy (2015) summarize, and Braun et al. (2017) support, that overall there is evidence of persistence but this has decreased over time.

The evidence of performance persistence, and the fact that there is great heteroscedasticity in overall fund performances (e.g. Kaplan & Schoar, 2005), suggests that there is variance in the skills of the general partners and that some general partners apply the value-increasing engineering on transaction level discussed earlier more effectively than others. Supporting this assumption, and documenting that persistence is not merely an US phenomenon, Diller and Kaserer (2009) find persistence in their European data that is not explained by market timing and conclude that these fund managers are skilled.

Building on Kaplan and Schoar (2005) who analyze persistence only in consecutive funds and closely previous funds, Korteweg & Sorensen (2017) use a different methodology and find significant long-term persistence with estimated returns between the top and bottom quartile firms being 7 to 8 percentage points annually. New to other research, they control for the effect of consecutive funds managed at the same time. A closely related aspect to general partner skill is their experience, i.e. how many funds the general partner has managed. Kaplan and Schoar (2005) document that more experienced funds perform better and are able to survive with less damage with funds raised in boom times that overall perform worse. In addition, Phalippou and Gottschalg (2009) find that inexperienced funds have lower performance. Further, buyout managers use their experience to raise larger funds earning them higher revenues per partner (Metrick & Yasuda, 2010). The ability to do this suggests that they earn the trust of limited partners, which implies high performance and a connection between experience and performance.

Since experienced managers raise larger funds, research has also studied the effect of fund size on fund performance. Overall, the evidence is consistently significant that fund size influences returns and that returns increase with fund size (for example Phalippou & Gottschalg, 2009). However, the relationship has also been found to be concave in shape resulting in a decrease in returns when the fund size grows really high (Kaplan & Schoar, 2005; Ljungqvist & Richardson, 2003; Robinson & Sensoy, 2016).

Nevertheless, research provides little theory on why fund size is a significant determinant for fund performance. In fact, skill and track record seem to be the stronger independent variables and fund size rather an artifact of those. Phalippou and Gottschalg (2009) conclude that fund size is a good proxy of skill and that past performance is a unique explanatory variable. On the other hand, the decreasing effect of fund size on fund performance when funds grow large could be due to these funds raised in boom times

when capital flow to private equity is high. When the market is hot, valuations are high leading to private equity funds' inability to close the best deals (Gompers & Lerner, 2000). Kaplan and Schoar (2005) suggest that funds raised during boom times perform worse.

Deal syndication, where private equity funds jointly sponsor a buyout, have also been found to affect returns.[1] The so-called club deals can be motivated by capital constraints prohibiting investments in high transaction value targets, which, while related to fund sizes, can influence fund performance. Even though capital constraints are not a barrier, diversification can induce syndication for large or risky buyouts. In addition to equity capital, syndication can influence the obtaining of leverage, which in a buyout has a significant role in return generation and value creation. If multiple firms enter a deal, the combined reputation can be greater than in sole-sponsored deals, and therefore be more attractive and credible for debt providers. (Cao et al., 2014; Officer et al., 2010)

One reason for improved returns in a club deal is the possible presence of collusive bidding, in which joint sponsors limit the number of competing bidders, and therefore increase their bargaining power over existing shareholders. Even in the absence of collusion, syndication can lead to lower prices when not enough private equity firms are interested in a target and competition is reduced. Cao et al. (2014) and Officer et al. (2010) report that targets in club deals are valued at lower multiples and target shareholders receive lower premiums, respectively. On the other hand, Guo et al. (2011), who find that returns are higher for club deals, find no significant relation to competition, and suggest that multiple firms are attracted by superior prospects, therefore leading to successful investments.

Previous literature has also suggested that fundraising, i.e. the capital inflows into private equity funds, has an effect on the success of private equity funds. Distinct from the other performance drivers discussed above, fund inflows can affect a broader range of funds,

[1] Literature primarily does not study syndication as a fund-level variable affecting returns but rather on transaction level. This is natural as syndication is not a fund characteristic, and it has implications on the selection and monitoring phases of individual deals. In fact, at least in the venture capital context, syndication affects returns primarily through the value added during holding period (Brander et al., 2002). Furthermore, in general, syndication is more common in venture capital than in later stage buyouts. On the other hand, a typical venture capital fund makes significantly more investments than a buyout fund, and therefore one syndicated deal in a buyout fund represents a higher share of the total number of investments in the fund. Thus, as one investment also significantly affects returns, here syndication is included under fund-level drivers for fund performance.

and therefore affect the whole market rather than particular funds. One specific branch of research has studied the effect of fund inflows on investment valuations. Gompers and Lerner (2000) find that capital inflows into venture capital funds increase the valuations of their investments, while the effect is highest in areas with the most venture capital activity. They argue that the inflation in prices is due to a demand pressure caused by a competition for a limited number of superior investment targets.

The relationship has been since also studied in the buyout context and on fund level. Ljunqvist and Richardson (2003) show that more money raised in a private equity funds' vintage year, both venture capital and buyout, the worse the fund's subsequent performance. They argue that the 'money chasing deals' phenomenon suggested by Gompers and Lerner (2000) is present also in the buyout industry. These results have been further confirmed by, for example, Harris, Jenkinson, and Kaplan (2014) and Kaplan and Strömberg (2009) who both document a negative relationship between capital commitments and fund returns. These results are consistent with Kaplan and Schoar (2005) who conclude that fund performance is procyclical: funds raised during boom times perform worse.

Table 2: Fund performance drivers

Fund performance driver	Supporting literature
Fund size	Kaplan & Schoar (2005), Ljungqvist & Richardson (2003), Phalippou & Gottschalg (2009), Robinson & Sensoy (2016)
General partner skill/experience	Diller & Kaserer (2009), Kaplan & Schoar (2005), Korteweg & Sorensen (2017), Metrick & Yasuda (2010), Phalippou & Gottschalg (2009)
Fund inflows	Gompers & Lerner (2000), Harris, Jenkinson, & Kaplan, (2014), Kaplan & Schoar (2005), Kaplan & Strömberg (2009) Ljungqvist & Richardson (2003)
Syndication	Brander, Amit, & Antweiler (2002), Cao et al. (2014), Guo et al. (2011), Officer et al. (2010)

2.4 Synthesis

Private equity is an alternative investment asset class where the capital comes from private entities and investors rather than being publicly listed. Buyouts are a type of private equity investments where a majority of a company's shares is bought by a private equity fund in order for the firm to control the board of directors and allow for making

value-adding decisions. Leverage buyouts are the most common financing type of buyouts and involve a significant amount of debt. The lifecycle of a private equity fund consists of fundraising, deal screening and sourcing, value adding, and exit periods. Often a fund has a contractual life of 10 to 13 years and the fundraising for a subsequent fund is started already a few years after the previous is raised. Private equity firms scale their business by raising larger funds, through which they earn higher fees. The success of an investment is determined by the actions taken in all phases of the fund's lifecycle. Typical exit routes include initial public offerings, sales to strategic buyers or sales to another private equity fund.

International private equity has grown rapidly during the past decades driven by the maturing private equity market in the US in early 1990s. This led to an increase in the number of firms outside the US as well as funds investing across borders. Despite gaining access to increased deal flow with cross-border investments, they do not come without risks. Cross-border private equity poses challenges related to informational asymmetries, cultural distance, and idiosyncrasies and nature of a foreign institutional environment in every phase of a fund's lifecycle. On the other hand, private equity firms can tackle these challenges by learning and gaining knowledge about foreign markets. This knowledge can be obtained by engaging in club deals with local firms, gaining direct multinational or country-specific investing experience or establishing local offices in the host country. In addition, the differences in the institutional environment can provide opportunities not present in the domestic market.

Private equity funds earn returns by selling portfolio companies they have developed during the holding period with a profit. This development is achieved through the value-increasing actions taken by the private equity firm that can be divided into financial, governance and operational engineering. These actions include incentivizing management, making changes in the management and developing operations by bringing in operational expertise. Generally, buyout investments have had positive increases in operating performance. The performance of a private equity fund can be measured in many ways, but most commonly internal rate of returns and multiples of invested capital are used. Historically, private equity funds have been found to outperform public markets, therefore making them a profitable alternative for investors. The performance of the funds is driven by the fund size, capital inflows into the funds, general partner skill and experience, and investment syndication.

2.5 Hypotheses

2.5.1 Cross-border investments and fund performance

A key condition for successful private equity business is the availability of potential deals and the ability to identify these deals. When investment opportunities for private equity firms improve, the bargaining power of the general partner usually increases due to the short-term constraint in the supply of funds, and this leads to accelerated investing and better returns for the fund (Ljungqvist et al., 2007). Regardless of whether the investment opportunity environment is measured in market valuation levels or merely in the number of available targets, it is on the responsibility of the general partner to select the prominent deals and when competent at this, they usually experience superior returns (Diller & Kaserer, 2009).

Since the investing climate in different geographies varies, the quality of investment opportunities in some countries can be significantly better than in others. In addition, some countries may be constrained by the number of available deals in absolute terms and relative to the number of existing private equity firms, and the returns have been found to be better when competition eases (Ljungqvist et al., 2007). Therefore, it is intuitive that by not limiting its investing initiatives to only domestic targets, a fund has access to more opportunities and increased chances for successful investments. Cross-border deals have been found to be associated with lower premiums (Cao et al., 2014).

The institutional and legal environments vary significantly across countries with implications on investing and value creation success. The strength of creditor rights of financial institutions affect the development of the country's credit market and strong credit markets provide more favorable debt financing (La Porta et al., 1998). The cost of credit, in turn, is a major determinant of private equity investment decision-making and pricing (Axelson et al., 2013; Ljungqvist et al., 2007) influencing the availability of investments and premiums paid. Strong creditor rights also allow borrowers to limit the value creation activities that private equity firms apply on their portfolio companies (Cao et al., 2014). Investing activity flows from countries with strong creditor rights to countries with weak creditor rights (Cao et al., 2014). Furthermore, strong shareholder protection increases the bargaining position of existing shareholders often increasing premiums (Cao et al., 2014; La Porta et al., 2002; Lerner & Schoar, 2005). Cross-border deals can therefore provide cheaper and more flexible opportunities.

Cross-border investing involves costs related to the geographic and cultural distance between the target company and the private equity firm suggesting a location bias (Aizenman & Kendall, 2008; Cumming & Dai, 2010). Especially, distance can be a inhibiting factor for capital flows (Tykvová & Schertler, 2014) making cross-border investing less likely. In addition, private equity investing has risks originating from information asymmetries, related to the target company and the institutional environment, which are likely to be exacerbated in cross-border settings (Wright et al., 2005). However, these risks are less likely in buyout investments since the private equity firm has more resources and the investments are later stage and made to more mature companies. This was also supported by the interviews, where the interviewees agreed that "Everybody knows how these deals are made", referring to that the use of advisors and the matured industry make the institutional differences insignificant.

Specifically, the challenges posed by the cultural distance can be anticipated and reacted on through rigorous deal selection and monitoring leading to increased investment success (Nahata et al., 2014; Wright, Lockett, & Pruthi, 2002). In fact, the performance for private equity investments might increase with cultural distance (Nahata et al., 2014) since, the challenges considered, it would not make sense for the firm to invest abroad unless due diligence and other screening were done carefully. Therefore, challenges are expected to be more closely related deal flow rather than performance and if a cross-border deal is done, the firm is more certain about its success than normally. Thus:

Hypothesis 1. The higher the share of cross-border investments in a fund, the better the fund performance.

2.5.2 Fund size, experience, cross-border investments and fund performance

Private equity is a type of service business that can be characterized as highly knowledge intensive. The success of a fund is, to a large extent, determined by the private equity firm's ability to find potential investments, structure them effectively, perform value increasing activities during the holding period of the investment, and facilitate a high value exit (Gompers et al., 2016). Therefore, general partner skill is a significant factor for the success of a fund as skilled general partners show their expertise by consistently realizing good returns for their funds. The performance of private equity funds persists with high returns on a previous fund likely leading to high returns in the following (Kaplan & Schoar, 2005; Kaplan & Sensoy, 2015; Robinson & Sensoy, 2016).

Private equity fund managers build on their experience and grow their business by increasing the size of the funds they raise (Metrick & Yasuda, 2010). By showing consistently good results, general partners earn a credible track record and build trusted relationships with investors who see them as skilled managers for their money. Experience is a key factor in fundraising and performance as younger funds invest in riskier buyouts in order to build a track record and to raise new, and eventually larger, funds (Ljungqvist et al., 2007). Hence, the size of the fund mirrors the experience and skill of the general partner and fund size can be considered a proxy of this skill (Phalippou & Gottschalg, 2009). Consequently, larger funds earn better returns (for example Kaplan & Schoar, 2005; Ljungqvist & Richardson, 2003; Phalippou & Gottschalg, 2009).[2]

The implications of fund size in a cross-border private equity context are twofold. First, larger funds have the ability to overcome the increased costs associated with investing in another country and do not run into capital constraints that easily. This means that larger funds can also respond to the investment opportunities, and therefore the market valuations, of a foreign country that might differ from the domestic. In general, larger deal values are positively associated with the possibility of a deal being a cross-border deal (Cao et al., 2014) implying that larger funds engage more in cross-border investing. This further suggests that limited fund size can be a reason for a private equity firm not to go international.

Second, as general partners who have raised large funds are likely skilled and experienced, they have knowledge about carrying out transactions in different environments and with different stakeholders. This knowledge may also include knowledge required to operate in a foreign country. Larger firms often manage larger funds with a higher number of executives and the ability to provide more intensity for monitoring investments. Firms with less human resources need more time to gain the required knowledge and to compete with existing local players. Larger funds are not that dependent on local help and have the capacity to invest in foreign environments. (Meuleman & Wright, 2011)

[2] The relationship between fund size and returns has been found to be U-shaped with returns starting to decrease when fund size grows very high (Kaplan & Schoar, 2005; Ljungqvist & Richardson, 2003; Robinson & Sensoy, 2016). This is due to very large funds being raised during boom times (Kaplan & Schoar, 2005) leading to "money chasing deals", increased competition, and significantly high valuations limiting the number of favorable investment opportunities (Gompers & Lerner, 2000; Ljungqvist et al., 2007). In this study, the boom time effect is controlled for with vintage fixed effects.

As large fund size positively affects fund performance and larger funds are better aligned for cross-border investing, large funds' performance in cross-border environments is expected to provide a moderating effect. Therefore:

Hypothesis 2. The higher the fund size with a high share of cross-border investments in a fund, the higher the performance of the fund.

2.5.3 Private equity club deals, local offices, cross-border investments and fund performance

Cross-border deals involve challenges for private equity firms because the knowledge required in foreign environments differs from that acquired in domestic markets (Dunning, 1993; Johanson & Vahlne, 1977). Private equity investing calls for special skills from the investors in international environments (Wright et al., 2005). Given the special knowledge and skill requirements involved in cross-border investing, managing the local environment by working with partners is the main motivation for firms to form alliances (Hitt et al., 2000). A weak, foreign institutional environment can be difficult for firms to deal with. Teaming up with local firms can provide foreign investors with access to resources and networks, knowledge about local operations, and deal flow, that can mitigate the challenges of less developed environments (Bruton et al., 2005). Consequently, these types of syndicated deals take place more commonly in countries with weak regulatory environment (Cao et al., 2014).

In a club deal, local investors can play a critical role in certifying and attracting potential deals, and by being able to better provide monitoring and value-increasing activities due to the closer location (Meuleman & Wright, 2011). Therefore, syndicating with local investors can lead to better screening and quality sourcing of deals, further converting into successful investments and better performance for the fund. On the other hand, syndicated deals are not as often cross-border deals as they are domestic deals (Cao et al., 2014). Given the agency costs involved with syndication (Meuleman et al., 2009), private equity investors might be better off investing alone as long as they have the required knowledge. This further affirms the assumptions that sophisticated private equity investors engage in club deals only when superior returns are available.

Due to improved monitoring and value-adding capability, club deals have been found to perform better in terms of financial return and accounting performance than sole-

sponsored deals, as exceptional deals attract multiple investors (Guo et al., 2011). Different investors have different skillsets and information, and can therefore bring in specialized value-adding capability to the managing of the investment (Brander et al., 2002). In addition to the improved company performance, syndication affects returns through prices paid. As multiple private equity firms form alliance, competition for bidding is limited either through collusion or merely reduced number of investors improving the buyers' bargaining position and decreasing premiums paid (Cao et al., 2014; Officer et al., 2010). Furthermore, club deals can allow for better terms for leverage as multiple investors may appear more attractive for debt financiers (Officer et al., 2010). In a cross-border setting, these effects are likely more acute due to the differences in firm capabilities across locations. Therefore:

Hypothesis 3. The higher the share of club deals in a fund with a high share of cross-border investments, the higher the fund performance.

Firms can learn about a foreign markets' institutional and investing environment, and reduce information asymmetries, by building connections and networks through collaboration with local partners (Bruton et al., 2005) and by gaining direct investing experience in a specific country. On the other hand, firms can build absorptive learning capacity and knowledge that is more accurate by establishing a local office in a country (Levinthal & March, 1993).

Having a local office can also reduce the need to rely on local partners, which might benefit the firm as syndication has its costs (Meuleman et al., 2009). Local office can be more effective than syndicates in that it provides more flexibility and allows for staying consistent with the firm's investing strategies. In a cross-border deal, having a local office and a local team carrying out the investment process can help tackle the idiosyncrasies of a foreign market and lead to higher returns through improved investment selection and monitoring. The presence of a local office has been found to mitigate the negative effects of cultural distance (Hammer et al., 2018). It is expected that the effect of cross-border share on fund performance increases with the level of local office deal share. Therefore:

Hypothesis 4. The higher the share of local office deals in a fund with a high share of cross-border investments, the higher the fund performance.

3 Data and methodology

3.1 Data

The empirical part of this thesis uses quantitative analysis methods to test and validate the foregoing hypotheses, and to help answer the research question. These are examined in the context of European buyout funds, with vintages from 2000 to 2010, performing domestic and cross-border investing. European funds provide an interesting testing ground since most of their investments occur within Europe, which features a great variety of institutional frameworks (Meuleman & Wright, 2011). The buyout investments to European based targets accounted for a third of the total investment value globally in 2017, only falling 10 percentage points short to US-based targets (MacArthur et al., 2018). The number of European private equity firms grew significantly from 1990 until the financial crisis in 2007, as indicated by Figure 5 in chapter 2.1.2.

Table 3 provides an overview of the investments made by European buyout funds with vintages from 2000 to 2010 based on the general partner location. The investments are reported based on the general partner headquarter location although investments might have been done through local branches. UK-based general partners are clearly the most active investors with over 50 % of investments in the data originating from the UK. The peak in the number of investments is reached in 2007 followed by a significant drop. This is consistent with that a private equity boom cycle ended that year (Kaplan & Strömberg, 2009) and a financial crisis followed.

The buyout fund data and the deals made by the funds are obtained from the data sources of Preqin. Preqin was founded in 2003 and provides financial data, information and research on the alternative assets market as well as tools to support portfolio management, valuation, and reporting. Their data covers the asset classes of private equity, venture capital, hedge funds, private debt, real estate, infrastructure, natural resources, and secondaries. The data types comprise of fundraising, investors, performance, dry powder, assets under management, and deal flow. They also publish research reports based on their data and contributions from investment professionals.

Table 3: Distribution of investments by general partner location

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Belgium	0	0	0	0	0	0	0	0	0	1	1	1	2	3	2	1	1	0	0	0	12
Denmark	1	3	1	1	4	7	7	14	5	5	4	4	11	2	3	2	0	0	0	0	74
Finland	0	0	0	0	0	1	8	8	17	6	8	17	8	3	3	3	0	2	0	0	84
France	8	8	14	19	30	70	88	70	56	37	65	57	52	18	25	29	18	9	7	1	681
Germany	4	2	5	4	6	7	10	17	14	2	9	8	1	4	2	1	3	1	0	0	100
Greece	0	0	0	0	0	0	1	5	4	0	0	1	0	0	0	0	0	0	0	0	11
Italy	0	1	1	3	5	8	14	15	19	4	6	3	7	5	4	9	7	5	5	0	121
Jersey	0	5	4	6	11	10	21	23	13	2	25	28	15	10	5	6	12	8	9	2	215
Luxembourg	0	0	2	5	3	4	7	4	4	3	5	4	0	1	0	0	0	0	0	0	42
Netherlands	1	8	2	5	6	14	22	16	11	8	15	9	4	1	1	0	2	0	0	0	125
Norway	0	2	1	3	5	6	8	15	12	8	8	10	5	7	2	1	0	4	0	0	97
Poland	2	3	0	9	5	11	10	12	12	10	13	17	5	5	3	3	2	1	2	0	125
Portugal	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Russia	0	0	0	0	0	0	0	0	1	1	2	3	3	0	0	1	3	0	0	0	14
Spain	1	0	0	0	0	1	6	7	3	11	10	8	3	6	4	2	0	0	1	0	63
Sweden	1	6	6	13	19	29	32	35	13	17	29	30	10	16	13	3	5	4	2	0	283
Switzerland	3	2	4	0	5	7	10	9	13	5	15	15	14	15	2	5	1	0	0	0	125
Turkey	0	0	0	2	0	3	4	1	6	1	2	3	0	1	0	0	1	0	0	0	24
UK	20	35	82	126	169	213	266	317	194	111	207	265	186	121	98	63	36	25	18	3	2 555
Total	41	75	122	196	268	391	514	568	397	232	425	483	326	218	167	129	91	59	44	6	4 752

The Preqin databases are used to extract two kind of information. Firstly, all buyout funds with vintages from 2000 to 2010, where the general partner location is listed in Europe, are exported from the Fund Performance Analyst Tool. The original data set includes 619 funds and is narrowed down to 287 funds that report any performance data as of March 31 2019. The follow-up period is chosen to be the most up-do-date available in order to maximize the number of most accurate reported performances, i.e. actual realized returns for limited partners. Secondly, all deals completed between the beginning of 2000 and March 31 2019 are extracted from the Buyout Deals Analyst Tool. The initial download yields 94 413 deals, which are then cross-referenced with the buyout funds. This operation gives the final number of deals of 4 752.[3]

All the deals are then marked whether or not they are cross-border deals and if a given deal is syndicated. This information is aggregated on the fund level to get the share of cross-border investments and share of syndicated deals for each fund. Out of the 287 funds, 17 did not have any deals in the deals data and are thus removed. Since net IRR is chosen as the measure of performance in this study, the data is further filtered to only include funds for which net IRR measure is available.[4] Therefore, the final sample consists of 226 funds managed by 122 private equity firms. However, to mitigate selection bias and to increase the validity and reliability of the study, the lastly removed funds are embedded into the analysis using the Heckman correction method, which is further explained in chapter3.3.3.

For defining a cross-border investment, the approach following earlier research (Buchner, Espenlaub, Khurshed, & Mohamed, 2018; Cao et al., 2014; Hammer et al., 2018; Meuleman & Wright, 2011) is taken. A deal is defined to be a cross-border deal if the headquarters of the private equity firm and the target company reside in different countries. On the other hand, many, especially bigger, private equity firms have offices in multiple countries and the local team most likely executes the deals the firm makes in these countries. To account for this, data on the firms' global offices is hand-collected from current and historical snapshots of company websites, news articles and Invest

[3] The deals downloaded from Preqin are reported by investor. This means that in case of a syndication, a deal with the same buyout ID appears multiple times in the data set. In other words, the deals are not unique on the deal level but rather on deal-investor level.

[4] Net IRR is the least available performance measures available for funds in Preqin most likely because it relies on specific inflow and outflow dates. Other performance measures reported include Called-up capital, Distribution to Paid-In, Residual Value to Paid-In, and Multiple of Invested Capital.

Europe directories. A deal is defined to be a local office deal if the target is outside the firm's headquarter country but the firm has an office in the country and the office was in operation before or on the same year as the transaction occured. A deal is a pure office deal if it is a cross-border deal and the firm did not have a local office in the country at the year of the investment.

Table 4 shows the distribution of deals by portfolio company location. The first column shows counts and shares for all deals, the second for all cross-border deals and the third for cross-border deals made to countries where the private equity firm has a local office. Similar to the deal counts by investor location, majority of deals are made to the UK, while France, US, Germany and Sweden follow. On the other hand, the UK does not fit into top 10 in cross-border deals, which suggests that most of the deals made in the UK are domestic deals. Cross-border deals tend to flow to the US where also most of the local office deals are made. Other frequent cross-border deals are made to Germany and France. Most of the countries with a high number of cross-border deals have greater share of local office deals than pure cross-border deals, which indicates that firms look to operate through the local branch.

Table 4: Distribution of deals by target company location

Target country	All deals		Cross-border deals		Local office deals	
	N	%	*N*	%	*N*	%
UK	1 190	25.0 %	60	2.5 %	26	2.3 %
France	724	15.2 %	267	11.0 %	168	14.7 %
US	440	9.3 %	440	18.2 %	277	24.3 %
Germany	371	7.8 %	293	12.1 %	209	18.3 %
Sweden	324	6.8 %	183	7.6 %	117	10.2 %
Italy	264	5.6 %	154	6.4 %	49	4.3 %
Netherlands	191	4.0 %	116	4.8 %	26	2.3 %
Other	175	3.7 %	172	7.1 %	40	3.5 %
Spain	161	3.4 %	108	4.5 %	47	4.1 %
Norway	132	2.8 %	80	3.3 %	27	2.4 %
Denmark	130	2.7 %	79	3.3 %	30	2.6 %
Finland	108	2.3 %	53	2.2 %	18	1.6 %
Poland	97	2.0 %	27	1.1 %	17	1.5 %
Switzerland	82	1.7 %	64	2.6 %	7	0.6 %
Belgium	66	1.4 %	62	2.6 %	25	2.2 %
Canada	46	1.0 %	46	1.9 %	0	0.0 %
Turkey	35	0.7 %	12	0.5 %	1	0.1 %
China	30	0.6 %	30	1.2 %	11	1.0 %
Australia	29	0.6 %	29	1.2 %	1	0.1 %
Czech Republic	28	0.6 %	28	1.2 %	13	1.1 %
India	26	0.5 %	26	1.1 %	17	1.5 %
Ireland	25	0.5 %	25	1.0 %	0	0.0 %
Romania	23	0.5 %	23	1.0 %	10	0.9 %
Austria	20	0.4 %	20	0.8 %	0	0.0 %
Luxembourg	18	0.4 %	18	0.7 %	6	0.5 %
Russia	17	0.4 %	4	0.2 %	0	0.0 %
Total	4 752	100 %	2 419	100 %	1 142	100 %

3.2 Variables

3.2.1 Variable overview

Descriptions of the dependent, independent and control variables used in the analysis are summarized in Table 5. Each variable and a brief definition is given in the table. A further explanation for each variable follows.

Table 5: Summary of variables used in the regressions

Variables	Definition
Dependent variable	
Net IRR	The net IRR reported in Preqin as of Mar 31 2019 by a particular fund
Independent variables	
Cross-border investment share	The number of cross-border deals relative to the total number of deals made by a fund
Cross-continent investment share	The number of cross-continent deals relative to total number of deals made by a fund
Control variables	
Fund size	Logarithm of the value of the fund in EUR as reported by Preqin
Club deal share	The number of syndicated deals divided by the number of all deals in the fund
Local office share	The number of cross-border investments to countries where the private equity firm has a local office divided by the total number of investments made by the fund
Country experience	The average number of investments a firm has made in a country three years prior to a given investment. The average is based on all investments by a fund, including domestic.
Specialization	The sum of squared shares of a fund's investments to a specific industry. The industry classification includes 9 industries.
Vintage dummies	Dummy variables representing vintage years

3.2.2 Dependent variable

The dependent variable in the analysis is continuous and provides a measure of a fund's performance. More specifically, the variable is the net of fees IRR available for limited partners reported in percentages and extracted from Preqin Fund Performance Analyst Tool. For liquidated funds, the value provides an actual measure of the realized return to the limited partners, while funds that have yet not fully divested their investments rely on interim IRRs. The interim IRRs have been found to provide sufficiently accurate measures of the performance (see Kaplan & Sensoy, 2015). *Net IRR* is widely used as a fund's performance measure by industry practitioners as well as academics (Diller & Kaserer, 2009; Harris, Jenkinson, & Kaplan, 2014; Kaplan & Schoar, 2005), and is therefore a well-suited dependent variable in this study.

3.2.3 Independent variables

Cross-border investment share

To study the effect of cross-border investments on fund performance, a measure of cross-border investment share in a fund is employed as an independent variable. The measure is straightforward and easy to calculate from the data extracted from Preqin's Buyout Deal Analyst Tool and by matching the investments with each fund. The value for the variable is calculated as the number of cross-border investments, that is, investments where the target's location is in a different country than the investor firm's location,[5] made by a fund divided by the total number of deals of the fund. The variable therefore gets values between [0, 1]. The variable is named *Cross-border share*.

Cross-continent investment share

To further test the effect of geographical location in the cross-border share, a measure of the level of cross-continent investments in a fund is used as an independent variable. Distance might be an interesting factor in European private equity since most of the investments are done within Europe where the distances are not as significant. To calculate the cross-continent investment share, the seven-continent model is used. Similar to the cross-border investment share, the *Cross-continent share* is the share of cross-continent investments by a fund relative to all investments made by the fund. Again, the variable gets values between [0, 1].

3.2.4 Control variables

Fund size

A measure of *Fund size* is included to test hypothesis 2. The fund values are reported in Preqin's buyout fund data and the values in euros are included in this study. Due to the values having a significantly wide and skewed range, a logarithm of the fund sizes is taken. Fund size has been found to be one of the key fund-level drivers for fund performance (Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; Robinson & Sensoy, 2016) and larger funds are often managed by skilled general partners and bigger firms, who have access to better resources and are not limited by capital constraints

[5] The locations of the private equity investor and the target are those observed in Preqin's data and for the investor, the location is always the location of the headquarters/primary office. Therefore, the data does not take into account whether the investment was done through a local branch.

(Metrick & Yasuda, 2010; Phalippou & Gottschalg, 2009). This can be particularly important in a cross-border context where a larger firm might be better able to succeed independently (Brander et al., 2002). Therefore, fund size is also included as a moderator on cross-border share.

Club deals

Club deals, or syndication, are also included as a control and a moderator variable to test hypothesis 3. It is calculated as the share of syndicated deals in a fund relative to all investments in the fund. A deal is defined as a club deal if it appears multiple times in the deals data and the investor firms in these other observations are found on Preqin's Fund Manager Export.[6] The variable gets values between [0, 1]. Club deals have implications on prices and premiums, deal selection, and attraction of debt that positively affect returns (Cao et al., 2014; Guo et al., 2011; Officer et al., 2010), therefore making it a relevant control variable.

Furthermore, syndication can be an important factor in tackling information asymmetries, idiosyncrasies, and limited knowledge of a foreign market (Meuleman & Wright, 2011). The calculation of the variable includes all types of investments made by the fund, even add-ons. Add-ons are a good strategy for internationalizing a portfolio company's business and the help of a local partner can be valuable in the process internationalization (Mäkelä & Maula, 2005). In addition, internationalization is a process of learning (Johanson & Vahlne, 1977), which helps the private equity firm to operate in foreign markets (Meuleman & Wright, 2011). Thus, *Club deal share* is added as a moderator for cross-border share's effect on fund performance.

Local office

Many private equity firms, especially bigger and older ones, have established operations outside their headquarter country in the form of local offices. A private equity firm can learn about a foreign market, build connections and networks in it and appear as a more credible and trustworthy partner when it has a local office in the target company's host country (Meuleman & Wright, 2011). This, in turn, reduces the challenges related to cross-border transactions and can positively affect the value-adding capability and the implied returns. Therefore, the number of companies' real cross-border deals, i.e. deals

[6] This is to make sure the syndicate firms are private equity general partners.

where the target company is in a country where the private equity firm does not have a local office, is reduced.

In order to control for the effect of deals made to countries with a local office, a variable *Local office share* is added. It is calculated as the sum of investments made by a fund to countries where the general partner has a local office, excluding investments to the headquarter country, divided by the number of all investments made by the fund. The measure gets a value of zero when a fund has no cross-border investments to countries with a local office and a value of one if all the fund's investments are cross-border deals to countries with a local office. As a local office can alleviate the challenges in cross-border settings, the effect of cross-border share is assumed to be positively moderated by high local office share. Therefore, local office is also added as a moderator on cross-border share to test hypothesis 4.

Country experience

In respect of internationalization and learning country-specific knowledge, a control variable *Experience*, measuring general partners' investing experience in a specific country, is added (Meuleman & Wright, 2011). To also capture how recent the knowledge and the built connections are in a country, the variable is calculated as the number of investments the private equity firm has made to a certain country, that is outside of the firm's headquarter location, during a three-year period prior to a given investment. These values are then summed up and an average based on all deals of the fund is taken to obtain a fund-level measure. A logarithm of the measure is taken due to the skewness in the values.

Private equity firms might be able to tackle the institutional and informational barriers raised in cross-border investing settings through learning and expanding activities across borders is a process of gaining knowledge (Johanson & Vahlne, 1977). By investing in a certain country, firms learn, acquire knowledge and build their networks through which they demonstrate absorptive capacity while processing investment opportunities (De Clercq & Dimov, 2008). Therefore, private equity firms can benefit from doing repeated deals in a particular country (Meuleman & Wright, 2011; Liu & Maula, 2016). Although partly similar learning may be acquired through syndication, a private equity firm may be better off investing alone in order to obtain a majority share of the target and due to the

risks and costs related to syndication (Meuleman & Wright, 2011). Thus, country level experience is important to take into account and is included as a control variable.

Specialization

Different private equity firms have different skills and information (Brander et al., 2002) and these skills might be industry-specific. Private equity firms, therefore, often follow a certain strategy and focus on particular sectors in order to exploit their knowledge. By having a high degree of specialization, and therefore playing to their strengths, private equity firms can have the ability to obtain competitive advantage, increase the performance of their portfolio companies and succeed better (Cressy et al., 2007; Gompers et al., 2009).

On the other hand, different industries are exposed to systematic risks and the economic performance of industries is dependent on different forces (Kaplan & Schoar, 2005). Finance theories, starting from Markowitz, suggest that through diversified portfolio selection, the risk can be reduced without reducing the expected returns. Therefore, a private equity firms may look to invest in various industries in order to diversify their portfolio and hedge themselves from the systematic risk. Diversification has also induced firms to syndicate (Manigart et al., 2006). Thus, industry specialization is controlled for in the study to capture its possible effects on fund returns.

The industry specialization index, *Specialization*, for a fund is calculated by applying the Herfindahl-Hirschman method, which is a common measure of market concentration. For each fund, the Herfindahl-Hirschman Index (HHI) is obtained by squaring the share of investments a fund has made to a specific industry and then summing these results. In theory, the measure can get values from close to zero, up to 10 000. As the calculation provides highly skewed values, a logarithm is taken to obtain the final value. The industry classes used, and their sub-industries, are listed in Table 6.

Table 6: Industry classification and sub-industries

Environment, Energy and Utilities	Consumer goods, Food and Retail	Healthcare	Industrials	Information Technology	Materials	Services	Telecoms, Media and Communications	Other
Clean Technology	Beverages	Biomedical	Aerospace	Computer Services	Agriculture	Business Services	Advertising	Beverages
Energy	Consumer Products	Biotechnology	Construction	Electronics	Chemicals	Consumer Services	Communications	Consumer Products
Environmental Services	Food	Healthcare	Defence	Gaming	Materials	Education / Training	Digital Media	Food
Infrastructure	Retail	Healthcare IT	Distribution	Hardware	Mining	Entertainment	Information Services	Gambling
Oil & Gas		Medical Devices	Engineering	High-Tech	Natural Resources	Financial Services	Marketing	Hotels and Offices
Power		Medical Instruments	Industrial	Internet	Production	Insurance	Media	Leisure
Renewable Energy		Medical Technologies	Logistics	IT	Timber	Outsourcing	Telecom Media	Property
Utilities		Pharmaceuticals	Manufacturing	IT Infrastructure			Telecoms	Publishing
			Shipping	IT Security				Restaurants
			Transportation	Network				Retail
				Semiconductors				
				Software				
				Technology				
				Wireless				

Vintage

The overall equity market affects fund returns with funds raised during boom times performing worse than those raised in downturns (Kaplan & Schoar, 2005). High market valuations clearly affect the prices private equity firms are able to buy and sell their investments for, which can affect the fund returns if most of the investments are made when valuations are high. More specifically, Kaplan and Schoar (2005) find that funds raised when markets are high are less likely to raise a follow-on fund, and that the ability to raise a follow-on fund is a good proxy of fund performance. A hot private equity market attracts capital commitments which has also been associated with poor performance (Harris, Jenkinson, & Kaplan, 2014; Kaplan & Strömberg, 2009).

The sample period of fund vintages, 2000 to 2010, used in this study falls over a critical financial crisis and an ending of a private equity boom cycle (Kaplan & Strömberg, 2009). The cost of debt was particularly favorable prior to 2007, which may have an effect on fund returns through the increased leveraging activity and consequential high pricing (Axelson et al., 2013). Therefore, it is important to control for the years the funds are raised and try to capture the effect that timing has on fund performance. Vintage year dummy variables are added to the analyses.

3.3 Methods

3.3.1 Linear regression analysis

The hypotheses testing procedure in this thesis uses regression analysis to study the relationship between the dependent and the independent variables. More specifically, since the dependent variable is a continuous outcome and there are more than one independent and control variables, multiple linear regression model is used to analyze the determinants of fund performance. Linear regression is a statistical method that models the relationship between the dependent variable and the explanatory variables and can be used for prediction purposes as well as explaining past relationship between variables. The relationship is established by calculating a best fitting line, a linear equation, to the observed data. A multiple linear regression equation can be mathematically expressed as follows:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n + \epsilon\,,$$

where y is the dependent variable, $x_{1\ldots n}$ are the independent variables, β_0 is a constant or the intercept of the line, $\beta_{1\ldots n}$ are coefficients of the independent variables, and ϵ is an error term.

The values for the betas, $\beta_{0\ldots n}$ in the above formula, can be obtained using a least square method. Here, the fitting regression is calculated by summing the squares of the deviations of each data point to the line. The squaring process eliminates the effect of observations falling on opposite sides of the line. Multiple linear regression analysis is subject to a few assumptions. Firstly, as the name suggests, the analysis requires that there exists a linear relationship between the dependent and independent variables. The analysis is also sensitive to outliers in data. Secondly, it is required that the residuals of the regression, i.e. the errors between the predicted and observed values, are normally distributed. Finally, the data should not suffer from multicollinearity. This occurs when independent variables correlate strongly with each other.

The results of the analysis are based on the significance of each variable and the values of the beta coefficients. The significance of variables are tested using a t-test, where the null hypothesis is that a coefficient equals zero, i.e. it has no effect on the dependent variable. If the variable is significant, the null hypothesis can be rejected and the changes in the values of the variable are related to the changes in the dependent variable. The beta coefficients values, on the other hand, represent a mean change in the dependent variable for a one-unit change in the independent variable and when the values of other variables are kept constant. They, therefore, provide the magnitude and the direction effect of independent variables on the dependent variable.

3.3.2 Effect of moderating relationships

To analyze the moderating effect fund size, club deals and local office deals have on the relationship between cross-border share and fund performance, and to test hypothesis 2 to 4, interaction variables are needed. Interaction variables are calculated as the product of the independent and the moderating variable. Mathematically a multiple linear regression model with the interaction term can be expressed as follows:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_1 x_2 + \epsilon ,$$

where y is the dependent variable, x_1 and x_2 are the independent variables, $x_1 x_2$ is the interaction variable, $\beta_{0\ldots3}$ are the beta coefficients and ϵ is the error term.

3.3.3 Robustness tests

Selection bias and Heckman correction

Due to the nature of private equity being, namely, private, the practitioners and related stakeholders are not bounded by the same reporting requirements as public entities. This includes the information on fund returns and other performance measures of the funds, as reporting returns of non-liquidated funds is subjective (Kaplan & Sensoy, 2015) and, more importantly, voluntary. The availability of data, or the lack thereof, poses risks of selection bias in private equity research (see e.g. Kaplan & Schoar, 2005, for discussion) when the desired performance metric is not available for the full sample population. This study is no different in that the data consists of only those funds who have reported the net IRR figures that might not be a random sample of the full population.

Since the objective of this study is to find evidence on how different cross-border investment shares affect the relative performance across funds, rather than reporting the absolute performances of the funds as outcomes, it might not be biased by abovementioned selection of funds. Although the selected funds might have superior performance compared to the normal values of the population, the relative effect of cross-border share might still be consistent.

Nevertheless, to account for possible selection bias and to increase the robustness of the study, a Heckman correction method for mitigating sample selection bias is used (Heckman, 1979). It is used also in prior private equity research (Cumming & Walz, 2010; Gompers & Lerner, 2000). Heckman correction method is a statistical technique taking place in two stages. In this case, the process first models the selection by estimating the probability that the performance of a fund is included in the sample, and then adds a function of these probabilities into the original regression formula as a variable.

In the first stage, the estimation of the probability should be based on factors that affect the likelihood for a fund to report their net IRR figures. Since funds' net cash flows tend to follow a J-curve so that real fund returns are realized later in the funds' lifecycle, and

therefore younger funds may show poor results, the number of deals made by the fund is used as the first estimator. When experiencing poor performance, private equity funds may not be as keen to report their return measures. Although a follow-up period of more than eight years is used to allow time for the funds analyzed in this study to realize actual returns, funds can have a contractual life of up to 13 years and excess returns are not shown until the very end of a fund's life (Kaplan & Strömberg, 2009; Ljungqvist & Richardson, 2003). A small number of deals can signal that the fund is still immature of that it is struggling with deal flow.

Secondly, as experienced and skilled fund managers are more likely to perform better and fund size is used as a proxy of general partner skill (Phalippou & Gottschalg, 2009), fund size is used as another estimator. Inexperienced private equity firms are more likely to engage in riskier investments due to pressure of fundraising (Ljungqvist et al., 2007) and might be hesitant to report their IRR figures.

Outliers and influential observations

The regression models used in the analyses of this thesis are tested for possible outlier and high influence points that can affect the fit of the models. Preliminary tests on normality with Q-Q plots, outliers with standardized residuals and hat values, and influential points with leverage and Cook's distance values and plots reveal that a few outlier and influential observations are present in the data. For example, one fund reports a net IRR value of 240 %, which is significantly greater than any other value. This value does not represent a common real-life IRR return for a buyout fund, and can therefore be a reporting mistake. To account for the skewness in the values, a method of winsorization is used. Winsorization balances out the most extreme points by bringing all values above and below the 95 and 5 % percentiles, respectively, to the percentile values. Since the aim is to study the relative relationship between fund performance and cross-border share, and not absolute return values, winsorization of the return data can be justified.

4 Results

4.1 Descriptive analysis

4.1.1 Descriptive statistics

The total sample consists of 226 European buyout funds with vintages between 2000 and 2010 and reported net IRR information as of March 31 2019. The sample with Heckman correction adds a selection of 44 funds forming an expanded sample of 270 funds. These funds made a total of 4 752 investments and are managed by 146 private equity firms. Out of the deals, 2 419 were cross-border deals and 670 were cross-continent. In 47 % (1 142) of the cross-border deals, the private equity firm had a local office in the target's country.

The summary statistics for the fund performance, the cross-border shares and the control variables are shown in Table 7. The average net IRR across the 226 funds is 18.35 % and the median is 13.95 %. These numbers are very well aligned with those of Kaplan and Schoar (2005) and Phalippou and Gottschalg (2009) at around 18 % and 13 %, while slightly higher than the around 13 % and 11 % reported by Diller and Kaserer (2009). However, these studies are mostly focused on funds raised earlier and the first two papers focus on US firms. The standard deviation in the sample is relatively high almost 21 %, which can be explained by the wide spread in the values ranging from around -12 % to almost 240 %.

Table 7: Sample description

	N	Mean	Std.Dev	Median	Min	Max
Net IRR	226	18.35	20.62	13.95	-12.2	239.8
Independent variables						
Cross-border share	270	0.41	0.36	0.33	0	1
Cross-continent share	270	0.10	0.19	0	0	1
Control variables						
Fund size	270	991.13	1 669.58	338.49	5.51	11 204.3
Club deal share	270	0.20	0.23	0.13	0	1
Local office share	270	0.16	0.25	0	0	0.93
Experience	270	0.92	1.82	0.12	0	16.34
Specialization	270	3 319.36	1 777.39	2 782.85	1 379.96	10 000
Vintage	270	2005.17	2.79	2006	2000	2010

The mean cross-border share, i.e. the number of cross-border deals relative to the total number of deals made by a fund, is 0.41 and the median is 0.33, while for cross-continent share the values drop to 0.10 and zero. This suggests that in an average fund, a considerable share of investment are made outside the firm's headquarter country and that European firms mostly operate in Europe. However, based on the standard deviations, these values tend to vary significantly.

In addition, the fund sizes have a very broad range from as small as 5.5 MEUR up to 11 204 MEUR. The average fund size across the sample is 991 MEUR and the median is 338 MEUR. Because of the broad range, the standard deviation is also large at 1 700 MEUR. For club deal and local office shares, the mean values are 0.20 and 0.16 respectively.

Table 8 shows the Pearson correlation matrix for the dependent, independent and continuous control variables used in the regression analyses. Some of the correlations between the variables appear to be high. To account for this, the regressions are tested for possible multicollinearity issues using variance inflation factors. In addition, the independent variables, i.e. cross-border and cross-continent shares and the interaction terms, are included in different regression models.

Table 8: Pearson correlations

	1	2	3	4	5	6	7	8
1. Net IRR	1.00							
2. Cross-border share	-0.07	1.00						
3. Cross-continent share	0.02	0.50	1.00					
4. Log(Fund size)	-0.26	0.55	0.33	1.00				
5. Club deal share	0.04	0.26	0.26	0.05	1.00			
6. Local office share	0.02	0.70	0.41	0.46	0.14	1.00		
7. Experience	-0.09	0.75	0.41	0.53	0.14	0.79	1.00	
8. Specialization	0.10	-0.13	-0.12	-0.43	0.12	-0.28	-0.32	1.00

4.1.2 Fund and deal characteristics

The fund size data is visualized further in Figure 8. The histogram shows that the fund sizes are skewed towards the lower end of the scale with about 60 % of funds having a funds size less than 500 MEUR. This is in line with Diller and Kaserer (2009) whose average fund size for buyout funds is 320 MEUR. On the other, in this study the average and median fund sizes are considerably larger, which is affected by the total of about 25

% of funds being bigger than 1 billion EUR. It should be noted that Diller and Kaserer's (2009) sample includes much older vintages and private equity industry has grown significantly thereafter.

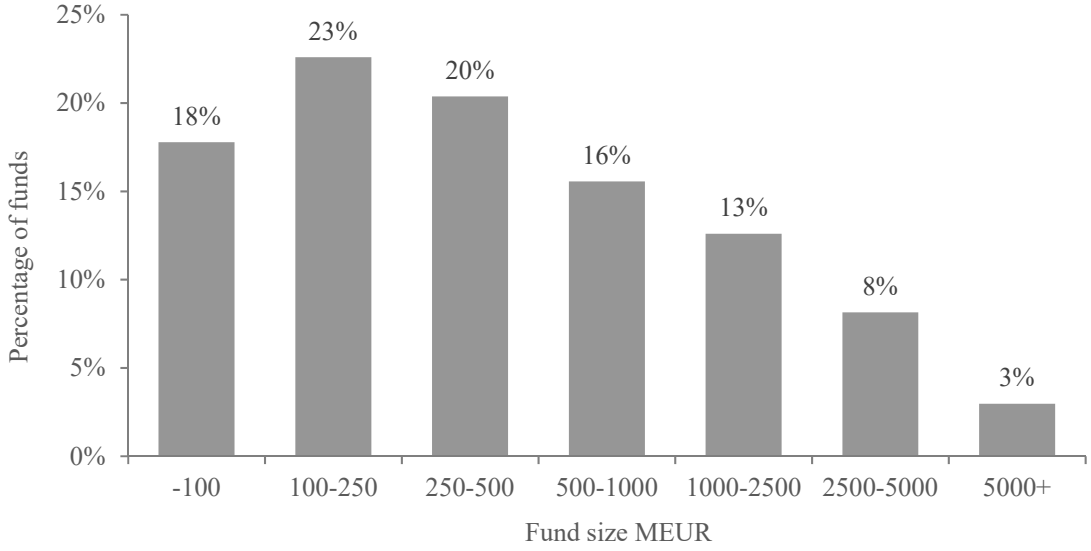

Figure 8: Percentage of funds by fund size

There is also some variation in the industry focus of funds as shown in Figure 9. Majority of funds, 85 %, invested in the industrials sector. This is followed by the consumer goods, food and retail sector as well as the services sector. Over 50 % of funds also invested in the information technology and healthcare sectors. The least invested sector was materials with 31 %. The distribution suggests that at least not many funds focus solely on one sector.

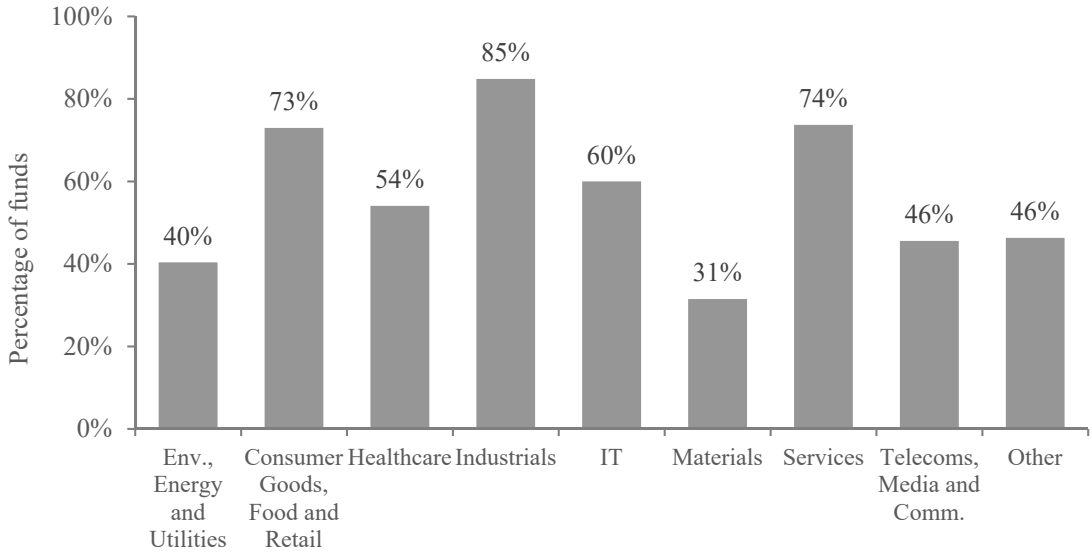

Figure 9: Percentage of funds investing in different industries

The distribution of funds by fund vintage year is shown in Figure 10. The private equity boom years can clearly be noticed in the figure with most the highest number of funds raised between 2005 and 2007 with a rapid decline thereafter. Surprisingly, there is a decline in the number of funds in 2004 without any clear explanation. Perhaps, the end of the industry boom made it difficult for these funds to exit their later investments lowering their returns, and therefore made the funds reluctant to report performance measures.

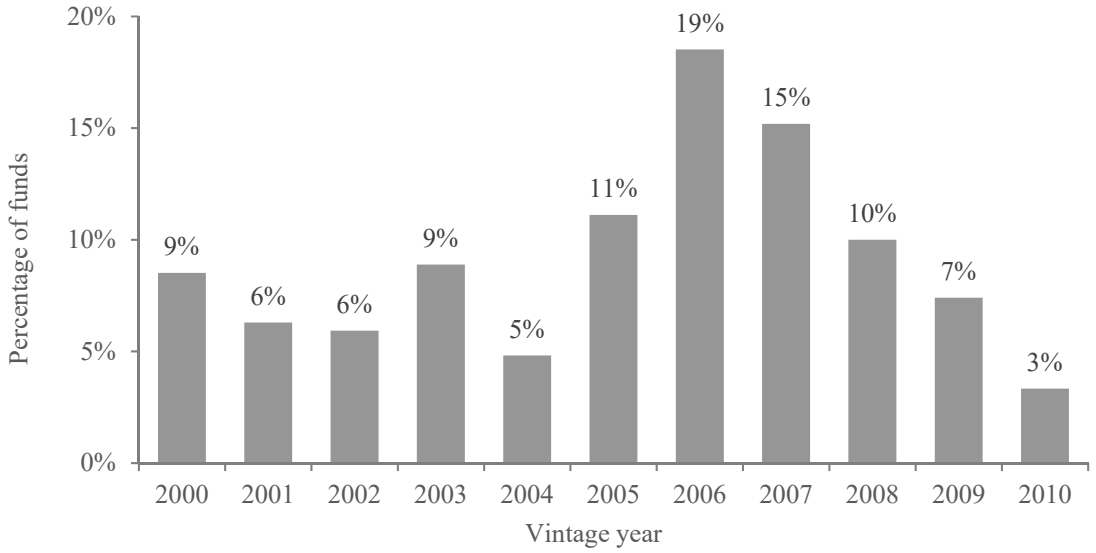

Figure 10: Percentage of funds by vintage year

Consistently with the deals data described in chapter 3.1, firms headquartered in the UK manage the greatest share, 44 %, of funds. The second and third biggest shares are for firms in France and Sweden, respectively. The results highlight the maturity of the British private equity market.

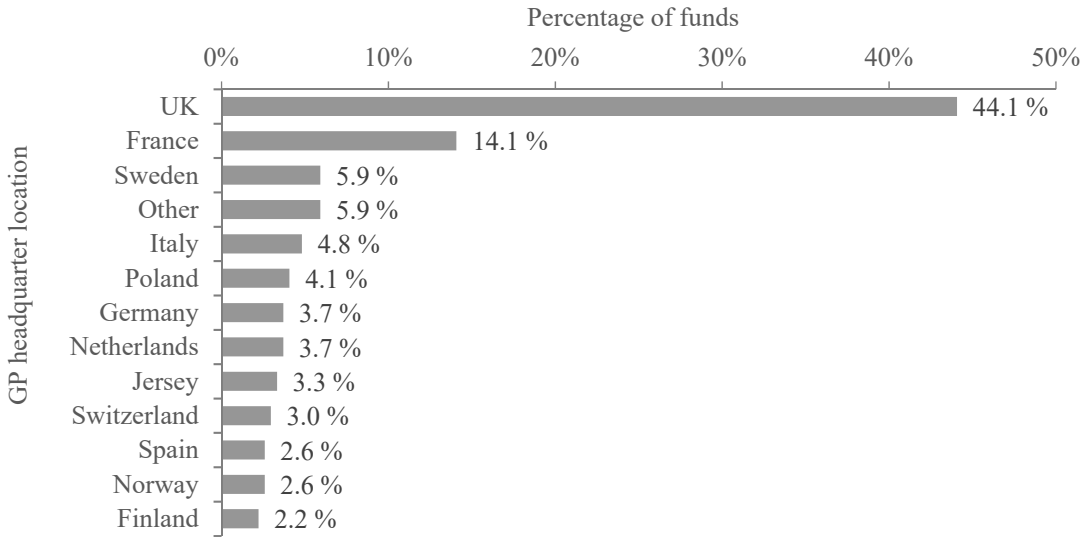

Figure 11: Percentage of funds by fund headquarter location

The quantities of different types of investments by fund vintage year are depicted in Figure 12. The overall quantities reflect the fundraising and the buyout industry with most of the investments made by funds with vintages around 2006. For each year, most investments made by the funds are buyouts, while the share of buyouts is smaller around the hot years. This suggests that during the boom years it might have been difficult to find reasonably priced buyout deals or that there was excess capital due to large capital inflows. Add-ons represent the second largest investment type each year.

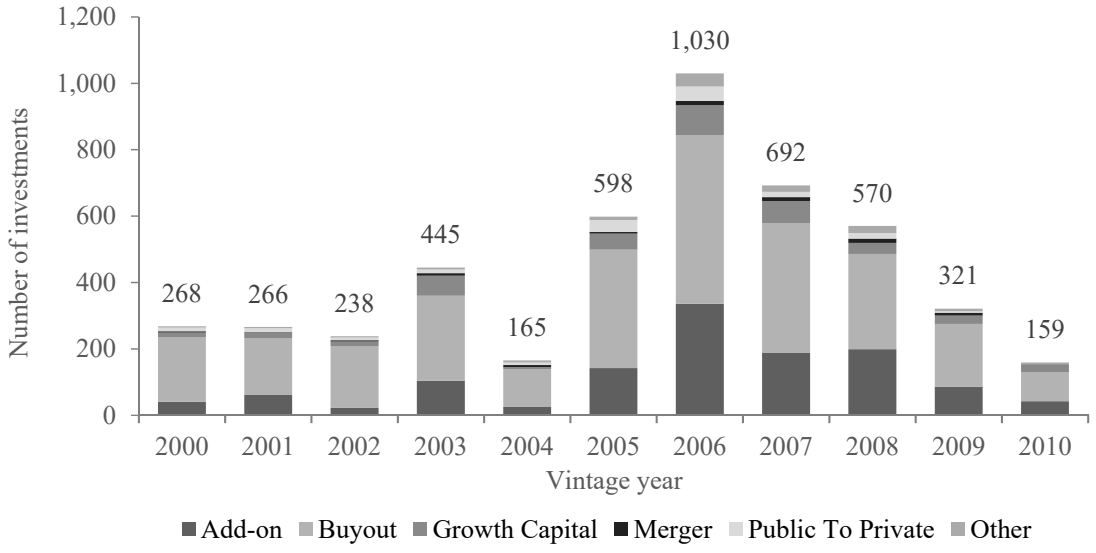

Figure 12: Number of investments by fund vintage for different investment types

The shares of domestic, pure cross-border and local office deals for each fund vintage are visualized in Figure 13. The results show some variation but no significant observations

can be made. The share of domestic deals is lowest for the 2006 vintage while it significantly grows in 2010.

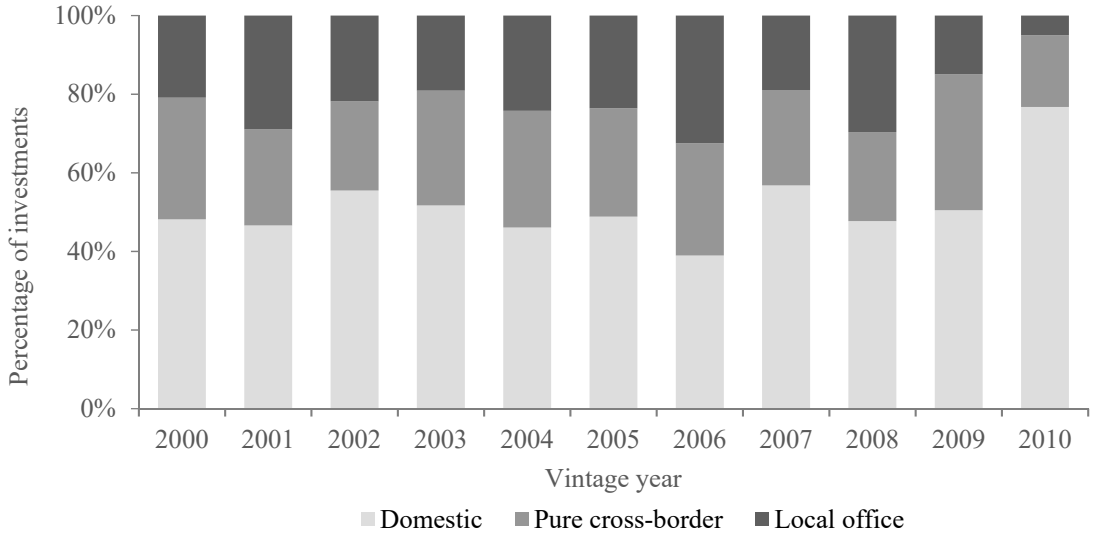

Figure 13: Percentage of domestic, cross-border and local office investments by vintage year

Figure 14 shows the number of domestic, pure cross-border and local office deals for different investment types. Majority of deals in all categories are buyouts but the share is significantly largest in domestic deals. The smallest share of buyouts is in pure cross-border deals. This suggests that funds invest in buyouts in the countries where they have operations, through a headquarters or a local office, and do cross-border add-ons while looking to grow their portfolio companies internationally.

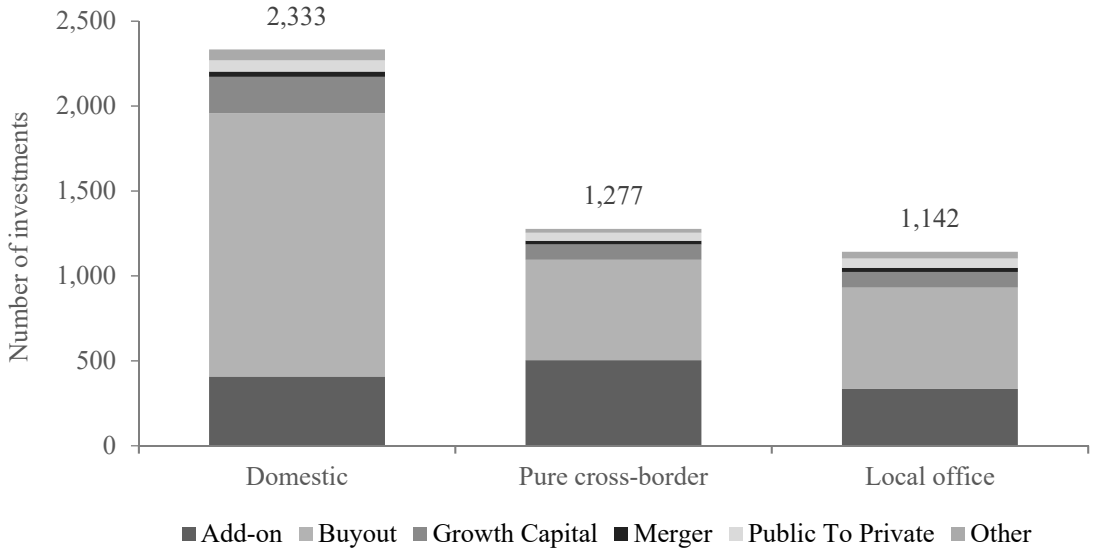

Figure 14: Number of investments by domestic, cross-border and local office deals for different investment types

The number of domestic, pure cross-border and local office deals for different fund sizes are depicted in Figure 15. The total number of investments is highest for funds between 250 and 500 MEUR. In addition, the number of investments does not decrease with the fund size but rather decreases suggesting that bigger fund sizes probably focus on larger deals. The share of domestic deals, however, decreases while fund size grows. This is intuitive as larger funds are more likely to be managed by larger firms that operate in many countries. The larger share of local office deals with the larger funds supports this observation.

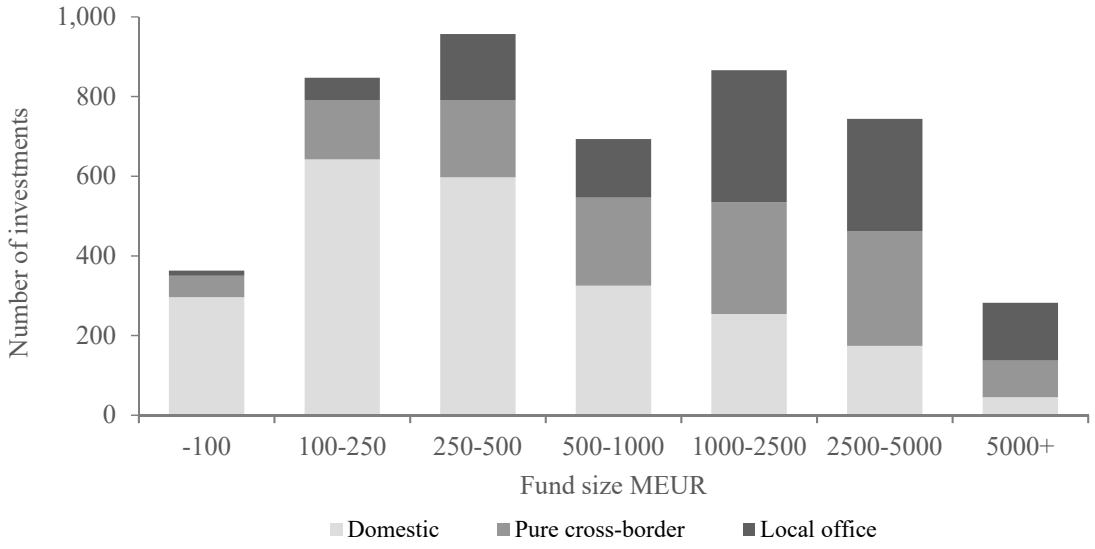

Figure 15: Number of domestic, cross-border and local office deals by fund size

Next, the share of domestic, pure cross-border and local office deals as well as the share of club deals by general partner headquarter location are shown in Figure 16. The highest share of cross-border deals are made by general partners located in Jersey, Switzerland and the UK. Jersey and Switzerland have also very high shares of local office deals suggesting that firms might keep their headquarter in these locations just for formal reasons. The highest shares of local office deals are with firms in Switzerland, France and Jersey. On the other hand, Italian and German firms tend to do a lot of domestic deals.

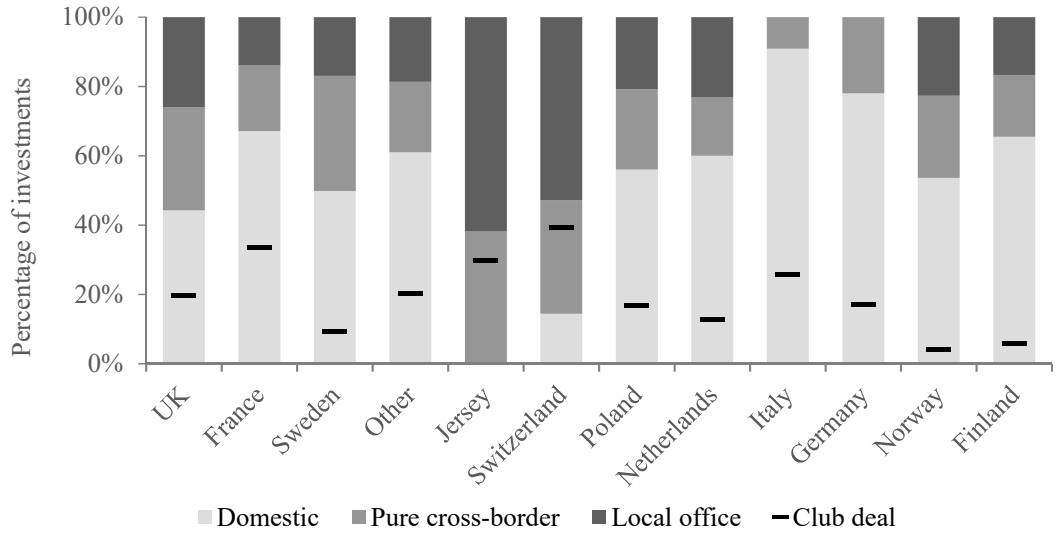

Figure 16: Percentage of domestic, pure cross-border, local office and club deals

Finally, the share of sole-sponsored investments and club deals for domestic, pure cross-border and local office deals are shown in Figure 17. The share of sole-sponsored deals is highest for domestic deals and lower for cross-border deals, which is in line with the theory that firms might benefit from syndication when investing across borders. On the other hand, the highest share of club deals is for local office investments. This could be induced by firms wanting to bring in specialized competence in their non-headquarter locations.

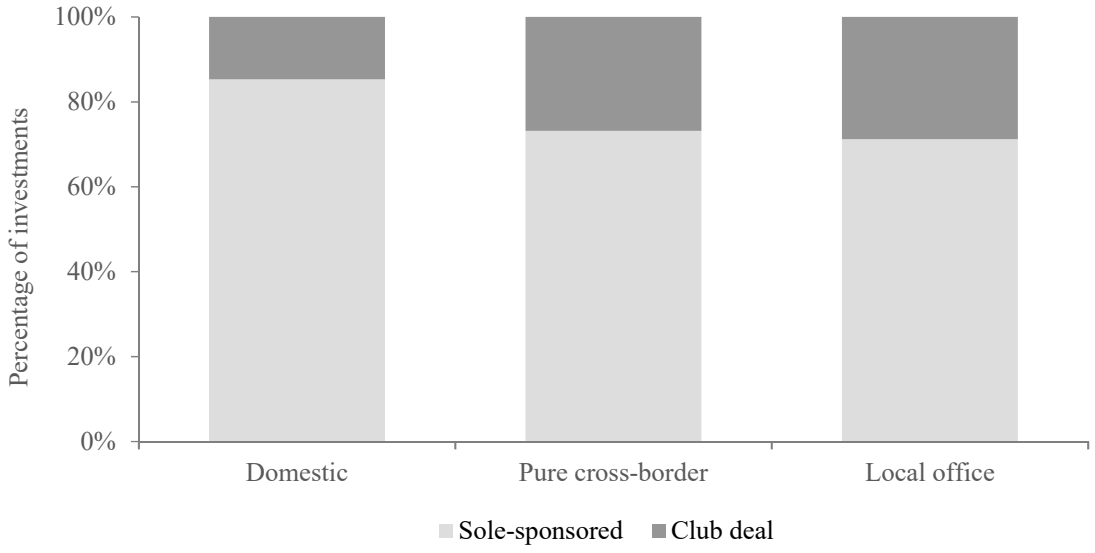

Figure 17: Percentage of club deals by domestic, cross-border and local office investments

4.1.3 Fund performance relationships

The following graphs visualize the relationships between fund performance metrics, i.e. the dependent variable, and the independent and moderator variables. Scatterplots are used since they can reveal initial effects about the relationship between two variables. Figure 18 scatterplots the funds' net IRR until 100 % and the cross-border share. One observation has a net IRR of 240 %, with no cross-border investments, and is therefore excluded from the plot. The values in the figure are very much scattered and no clear trend can be observed. Even the negative IRR values are spread out between low and high levels of cross-border share.

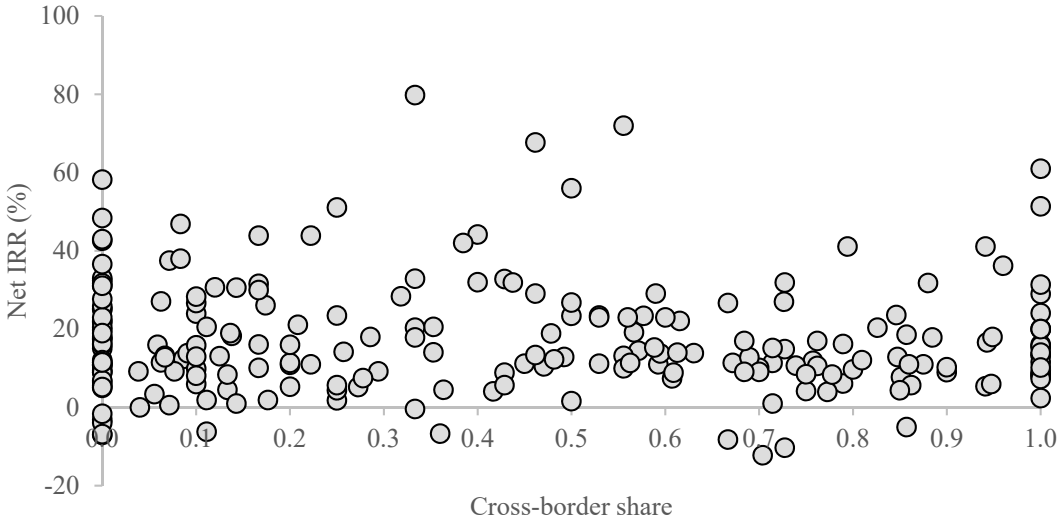

Figure 18: Fund IRR and cross-border share

Figure 19 plots fund IRR against the natural logarithm value of fund size.[7] Surprisingly, it seems that a slightly decreasing trend can be observed from the graph. On the other hand, there seems to be an upward trend from about a midway up of the scale, whereas the trend seems to be downward before the midway point. Most of the negative IRR values are scattered between five and seven of the logarithm of fund size. This suggests that there could be a convex relationship between the variables. Both of these observations are counterintuitive based on the theory discussed earlier.

[7] The relationship was also tested with a base 10 logarithm with similar results.

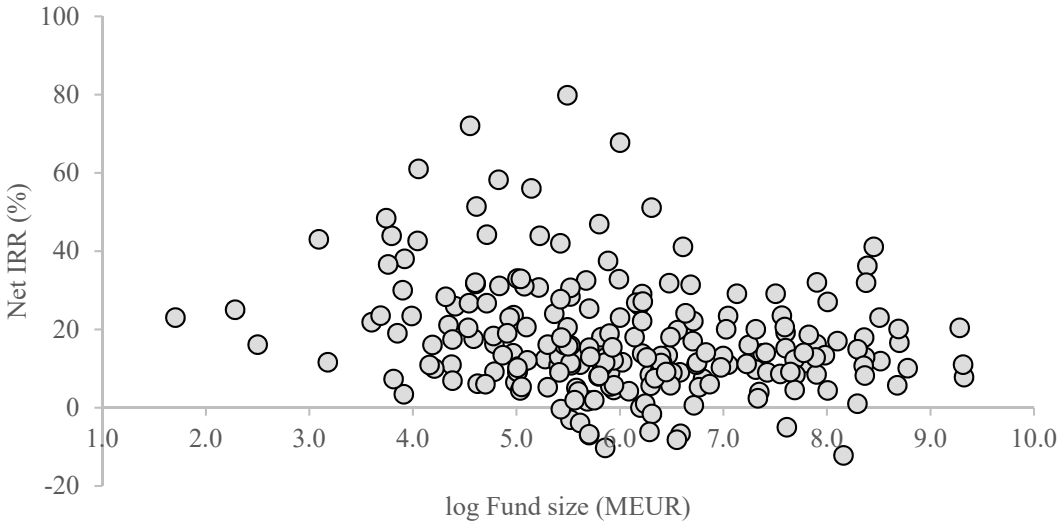

Figure 19: Fund IRR and logarithm of fund size

Next, Figure 20 shows the relationship between fund IRR and the fund club deal share. Here, many values are scattered in the lower left corner while values in the upper end of the scale seem to be somewhat higher. Therefore, a slight upward trend can be observed in the graph. However, no conclusions can be made due to the high number of observations being in the lower end of the scale and at the zero club deal share level.

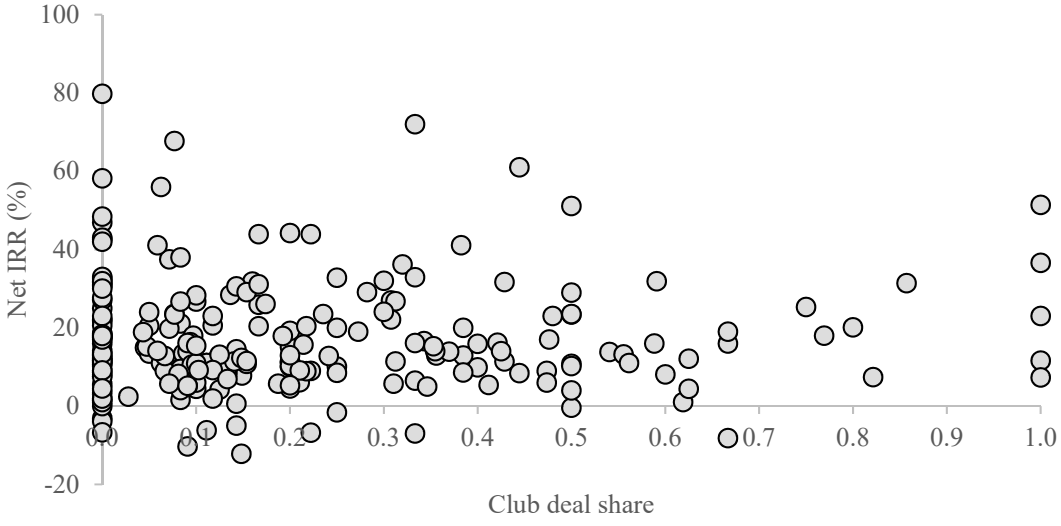

Figure 20: Fund IRR and club deal share

Figure 21 plots the fund IRR based the funds' local office share. Clearly, a great number of funds do not have any local office deals made as many points are distributed at the zero local office share level. In fact, based on the data, 63 % of funds do not have any local

office investments. After this, the points seem to show an upward trend implying that a greater local office share could mean higher fund performance.

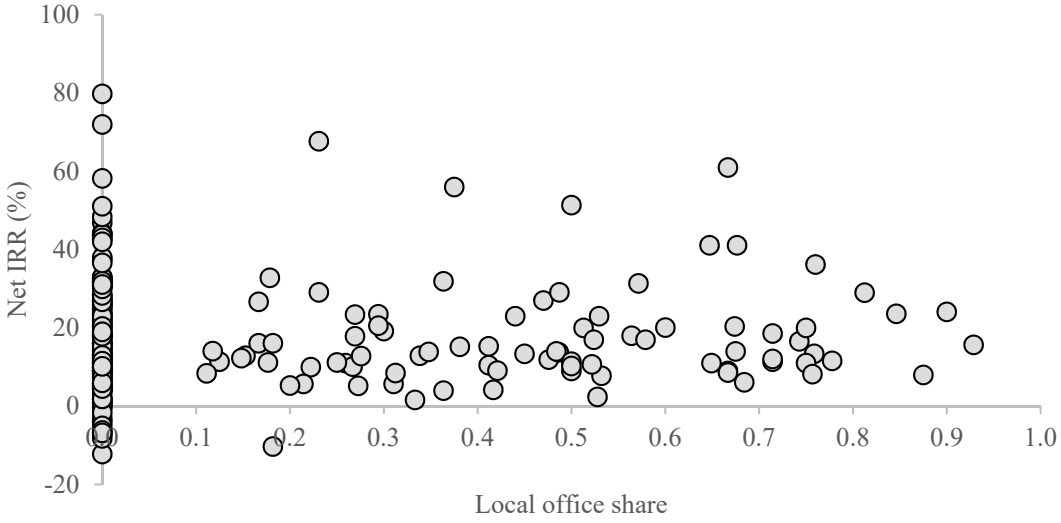

Figure 21: Fund IRR and local office share

Finally, Figure 22 gives a comparison for the performance measure and cross-border share as net multiple is used. This also expands the sample size to cover the whole Heckman selection and a total sample size of 270 funds. Here, the values are again very spread-out and no clear conclusions can be made. However, the values at the lower levels of cross-border share seem to be mostly slightly below those of the higher shares. This implies there may be a positive relationship between the cross-border share and net multiple.

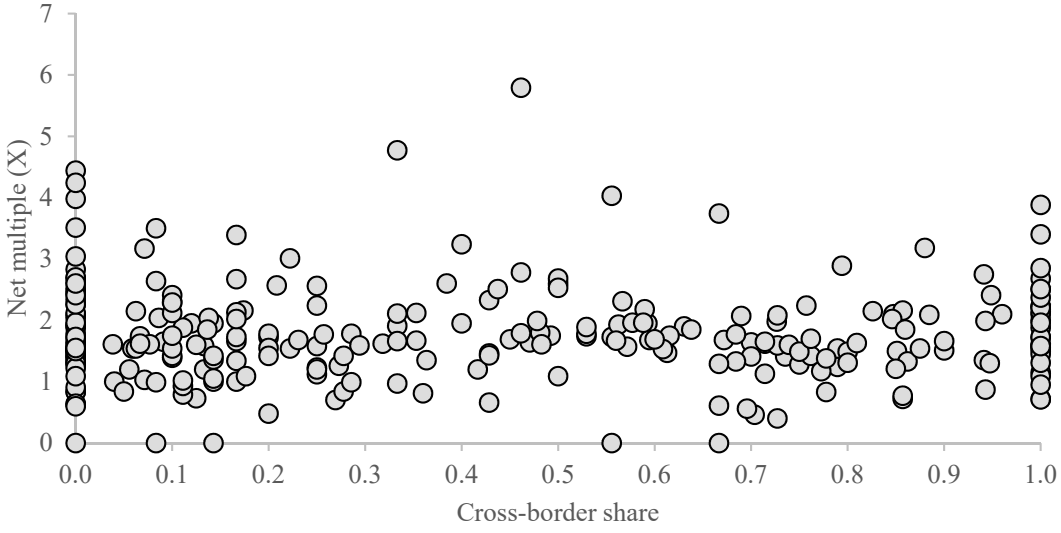

Figure 22: Fund net multiple and cross-border share

4.2 Regression analysis

Table 9 presents the estimates for the effects and factors for the relationship between buyout fund performance and the level of cross-border investment share in the funds. Models 1 to 7 are estimated using OLS regression on the sample that has net IRR values reported. Model 8 corrects for possible selection bias using a two-stage Heckman sample selection method with the maximum likelihood algorithm. The dependent variable for all models is net IRR. The net IRR values are winsorized to the fifth and 95th percentiles. Due to some evidence of heteroscedasticity being present in the models, robust standard errors are reported and used when calculating significance tests.

Model 1 in column (1) presents a base model including only the control variables. Out of the continuous variables, club deal share, specialization and country experience are not significant in explaining fund IRRs. Fund size is highly significant across all models but has a negative sign suggesting an inconsistency compared to prior research. The local office share is also significant in all models, where it is not included as a moderator, mostly at a 1 % level and has a positive coefficient that is relatively large. This implies that investing through a local office when operating across borders leads to better performance. In addition, all vintage dummies between 2005 and 2010 have negative signs and all are significant at least at a 5 % level. This is in line with private equity boom cycle ending, and funds raised around the time struggling with performance.

Models 2 and 3 introduce the independent variables separately in order to account for correlation between the variables. Model 2 adds the main independent variable, cross-border share, which has an opposite to expected sign but is not significant. In model 3, cross-continent share is added, which in turn is positive and significant. These results provide no direct support for hypothesis 1 but the significant and positive cross-continent share implies that there may be a positive relationship between distant investments and performance.

Table 9: Regression results, main models
Dependent variable = Net IRR

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cross-border share		-1.61		-21.48*	-3.53	-1.79	-24.46*	-24.44*
		(3.29)		(10.12)	(3.52)	(3.55)	(10.18)	(10.19)
Cross-continent share			7.24*				6.11*	6.11*
			(2.97)				(2.89)	(2.89)
Cross-border share x Fund size				3.58*			3.60*	3.60*
				(1.57)			(1.59)	(1.59)
Cross-border share x Club deal share					6.94		8.95	8.94
					(8.18)		(8.06)	(8.06)
Cross-border share x Local office share						3.13	-9.93	-9.92
						(11.44)	(12.04)	(12.04)
log(Fund size)	-2.41***	-2.30***	-2.57***	-4.03***	-2.33***	-2.29***	-4.20***	-4.21***
	(0.52)	(0.60)	(0.52)	(1.01)	(0.61)	(0.61)	(1.08)	(1.08)
Club deal share	-3.35	-3.14	-4.13	-4.26	-5.94	-3.15	-8.35	-8.35
	(3.30)	(3.26)	(3.35)	(3.36)	(4.88)	(3.25)	(5.12)	(5.12)
Local office share	8.69**	9.34**	7.91*	8.62**	9.62**	6.57	17.47	17.47
	(3.22)	(3.44)	(3.31)	(3.24)	(3.43)	(11.01)	(11.57)	(11.57)
Experience	-0.88	-0.47	-1.36	-1.16	-0.43	-0.39	-1.52	-1.53
	(1.36)	(1.41)	(1.42)	(1.34)	(1.37)	(1.51)	(1.43)	(1.43)
Specialization	-1.53	-1.35	-1.42	-1.31	-1.46	-1.38	-1.17	-1.16
	(1.80)	(1.83)	(1.79)	(1.77)	(1.79)	(1.82)	(1.74)	(1.73)
Vintage 2001	6.03†	6.01†	6.00†	6.70*	6.09†	6.07†	6.59†	6.59*
	(3.59)	(3.57)	(3.47)	(3.33)	(3.66)	(3.57)	(3.35)	(3.35)
Vintage 2002	5.52†	5.52†	6.00†	6.83†	5.58†	5.54†	7.24*	7.24*
	(3.28)	(3.32)	(3.25)	(3.57)	(3.29)	(3.33)	(3.53)	(3.53)
Vintage 2003	2.71	2.73	3.02	3.17	3.11	2.76	3.84	3.83
	(3.66)	(3.66)	(3.65)	(3.66)	(3.72)	(3.66)	(3.69)	(3.70)
Vintage 2004	-0.56	-0.49	-0.14	-0.21	-0.26	-0.39	0.14	0.14
	(3.77)	(3.73)	(3.74)	(3.81)	(3.75)	(3.76)	(3.87)	(3.87)
Vintage 2005	-7.13*	-7.20*	-6.77*	-6.81*	-7.09*	-7.16*	-6.53*	-6.53*
	(3.33)	(3.33)	(3.29)	(3.28)	(3.35)	(3.33)	(3.25)	(3.26)
Vintage 2006	-10.88***	-10.92***	-10.72***	-10.43***	-10.62***	-10.88***	-10.05***	-10.06***
	(2.38)	(2.37)	(2.35)	(2.39)	(2.46)	(2.38)	(2.47)	(2.47)
Vintage 2007	-12.43***	-12.51***	-12.15***	-12.11***	-12.22***	-12.50***	-11.55***	-11.56***
	(2.61)	(2.61)	(2.56)	(2.62)	(2.70)	(2.61)	(2.66)	(2.66)
Vintage 2008	-9.89***	-9.94***	-9.77***	-9.22***	-9.66***	-9.92***	-8.86***	-8.86***
	(2.41)	(2.44)	(2.33)	(2.45)	(2.53)	(2.44)	(2.50)	(2.50)
Vintage 2009	-7.06**	-7.04**	-6.66**	-6.25*	-6.62*	-7.01**	-5.46*	-5.46*
	(2.50)	(2.51)	(2.48)	(2.59)	(2.64)	(2.49)	(2.71)	(2.71)
Vintage 2010	-10.68**	-10.75**	-10.75**	-9.61*	-10.62**	-10.75**	-9.54*	-9.55*
	(3.62)	(3.64)	(3.60)	(3.80)	(3.66)	(3.63)	(3.86)	(3.86)
N	226	226	226	226	226	226	226	270
R-squared	0.38	0.38	0.38	0.39	0.38	0.38	0.40	

OLS regression on the IRR reported sample only in models 1-7. Heckman sample selection in model 8. Robust standard errors in parentheses. *** p < 0.001; ** p < 0.01; * p < 0.05; † p < 0.1.

Models 4 to 6 introduce the moderator variables one by one with the cross-border share variable. In model 4, the fund size moderator has the expected sign and is significant, thus supporting hypothesis 2. Now also cross-border share is significant with a negative sign. The club deal share and local office share moderators in models 5 and 6 have the expected signs in line with hypothesis 3 and 4, respectively, but are not significant. In addition, the local office share control loses its significance when it is introduced as a moderator.

Model 7 is the full model with all variables. Model 8 replicates model 7 but uses a Heckman sample selection model. The results between the two models are very similar. All the previously significant non-control variables retain their significance and signs. Overall, these observations provide mixed results. The general cross-border share seems to be negatively associated with fund performance providing opposite support for hypothesis 1. On the other hand, the cross-continent share has a positive effect providing partial support for hypothesis 1. Figure 23 shows the predicted values and confidence intervals of cross-border share (in Panel A) and cross-continent share (in Panel B), based on model 7. A move from no cross-border investments to all investments being cross-border in a fund decreases net IRR by 2.6 %-points. The same effect for a unit change in cross-continent share is 6.1 %-points. Although the effect is larger for cross-continent share, so is the confidence interval with higher levels of cross-continent share due to fewer observations in that end.

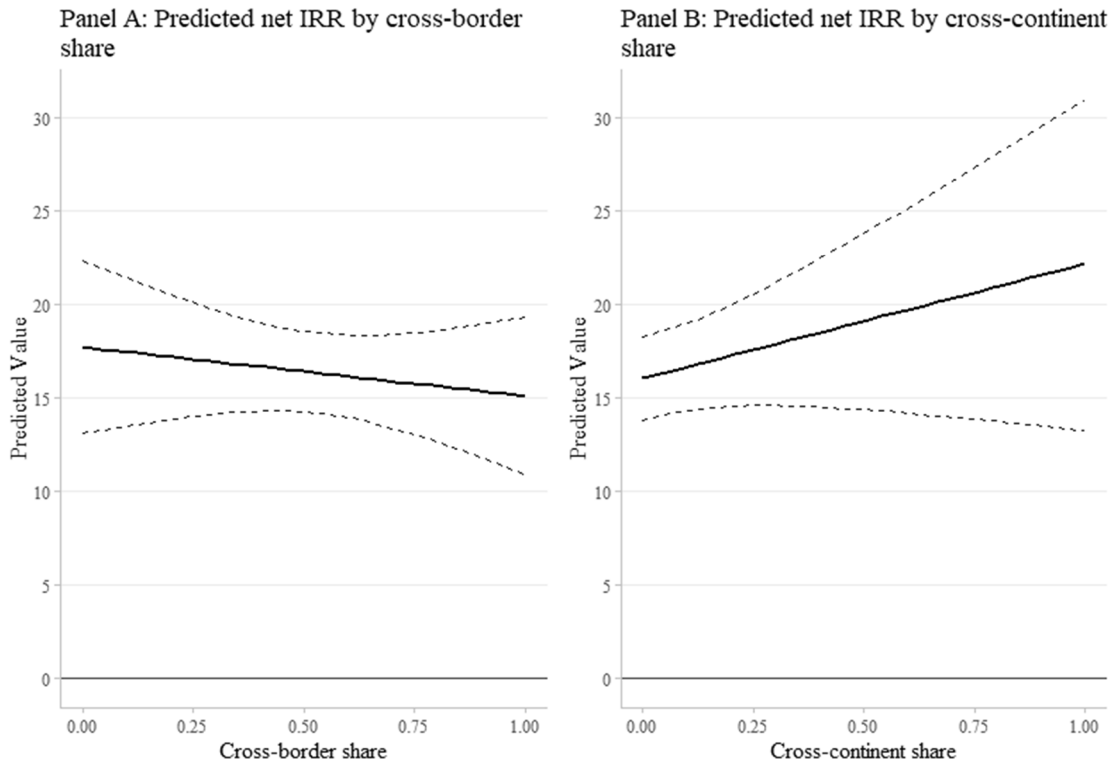

Figure 23: Predicted fund performance values and confidence intervals of cross-border and cross-continent shares

Regarding other hypotheses, although the effect the constituent variable of fund size is negative, the interaction effect is positive supporting hypothesis 2. Hypotheses 3 and 4 are not supported based on the insignificance of the variables. The interaction effect of fund size and cross-border share is further interpreted by analyzing the average marginal

effects of the term based on model 7 (Mize, 2019).[89] These effects are illustrated in Figure 24. Panel A plots the average marginal effects of cross-border share across the range of fund sizes. It can be seen from the graph that cross-border share has the strongest and most significant effect at the lower fund size levels. Because the effects are negative, this indicates that the higher the cross-border share with small fund sizes, the worse the fund performance is. However, the effect loses its significance quickly after log(fund size) of 4 MEUR and even turns positive at around 6.7 MEUR. This, and the steep slope of the line, suggest that the effect decreases as fund sizes get bigger and that the effect could even be positive with very large fund sizes. Nevertheless, this supports hypothesis 2 that fund size moderates the effect of cross-border share on fund performance.

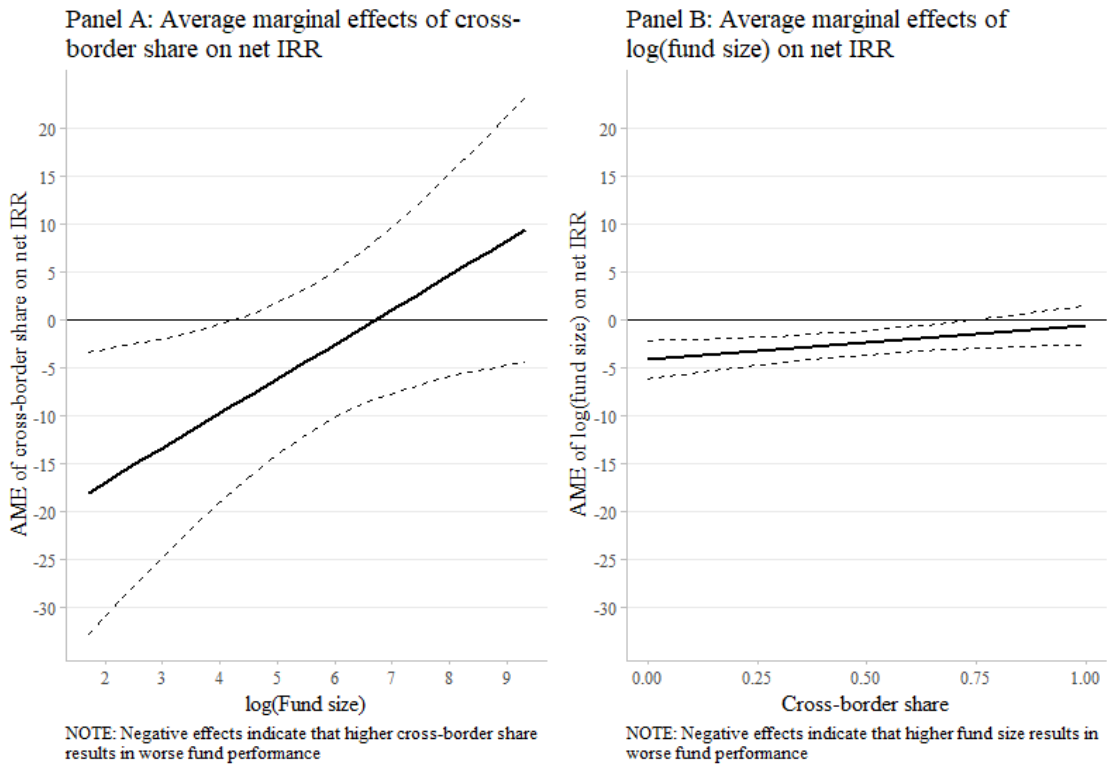

Figure 24: Interaction effects of cross-border share and fund performance on buyout fund performance

Panel B in Figure 24 plots the same interaction effect from the other side: how the effect of fund size on fund performance varies across different levels of cross-border share. Here, all effects are negative, and significant until right after cross-border share level of 0.75, indicating that in many cases large fund size results in bad fund performance

[8] The margins-function in R (Leeper, 2018) does not allow for using Heckman selected sample model, calculated with the sampleSelection package (Toomet & Henningsen, 2008), to calculate the marginal effects. Therefore, an ordinary linear model is used.
[9] Mize (2019) analyses nonlinear interaction effects. However, the interpretation method is similar for linear models.

regardless of the level of cross-border share, although the effect is larger with low levels of cross-border share. The insignificance of the effect with high levels of cross-border share provide a possibility that high fund size would have a positive effect on fund performance which would provide further support for the preliminary findings in Panel A. However, the effect in Panel B is far more flatter than in Panel A indicating that fund size is a more impactful factor on fund performance when cross-border share is high than what high fund size is with different cross-border share levels.

Table 10 presents additional models for further investigations on the effects of the variables. Starting from the first column, models 9 to 14 include the Heckman selection sample with 270 observations, while model 15 uses the sample including reported IRRs. All models include vintage dummies, whose values are not shown since they are very similar to the values in the models in Table 9. In model 9, a quadratic term of fund size is added as a control. The linear term remains significant and negative while the quadratic term is positive and significant implying a U-shaped relationship between fund size and returns. This result is opposite to some prior literature suggesting a concave relationship between fund size and returns. In model 10, the quadratic term of fund size is added as a moderator on cross-border share. While fund size and its quadratic term sustain their signs, no statistical significances are found.

Models 11 to 14 introduce the interaction effects on cross-continent share. The results are largely insignificant with only club deal share moderator being weakly significant at 10 % level with an expected positive sign. This gives partial support for hypothesis 3 although the statistical significance is not strong. In addition, with the moderators present, the cross-continent share variable loses its significance. Finally, model 15 shows the full model, as in model 7 in Table 9, but adds firm country fixed effects. With firm fixed effects included, the significances of cross-border and cross-continent shares as well as the fund size moderator on cross-border share reduce to 10 % level. The respective negative, positive and positive signs are retained but all the effect sizes are reduced.

Table 10: Regression results, additional models
Dependent variable = Net IRR

	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Cross-border share	-1.25	-12.23					-19.04†
	(3.29)	(34.31)					(10.14)
Cross-border share x log(Fund size)		2.17					2.71†
		(10.16)					(1.58)
Cross-border share x log(Fund size)^2		-0.04					
		(0.77)					
Cross-border share x Club deal share							8.60
							(7.59)
Cross-border share x Local office share							-6.81
							(13.37)
Cross-continent share			-1.56	3.18	9.11	-3.07	5.44†
			(17.76)	(3.55)	(6.61)	(16.98)	(3.28)
Cross-continent share x log(Fund size)			1.29			1.30	
			(2.43)			(2.20)	
Cross-continent share x Club deal share				13.10†		12.55†	
				(7.90)		(7.54)	
Cross-continent share x Local office share					-3.89	-5.17	
					(11.71)	(11.06)	
log(Fund size)	-9.79***	-8.25†	-2.69***	-2.61***	-2.60***	-2.76***	-4.02***
	(2.90)	(4.48)	(0.62)	(0.52)	(0.53)	(0.64)	(1.11)
log(Fund size)^2	0.63**	0.43					
	(0.22)	(0.42)					
Club deal share	-5.13	-5.00	-4.31	-5.73	-4.16	-5.88	-4.66
	(3.45)	(3.40)	(3.40)	(4.01)	(3.35)	(4.03)	(5.42)
Local office share	8.81**	8.64**	8.02*	7.99*	8.38*	8.65*	15.40
	(3.30)	(3.24)	(3.29)	(3.22)	(3.48)	(3.49)	(12.48)
Experience	-0.88	-1.08	-1.47	-1.31	-1.42	-1.39	-1.53
	(1.38)	(1.35)	(1.40)	(1.37)	(1.40)	(1.34)	(1.44)
Specialization	-1.14	-1.18	-1.36	-1.26	-1.38	-1.21	-2.02
	(1.78)	(1.77)	(1.79)	(1.78)	(1.79)	(1.79)	(1.92)
Vintage dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GP country fixed effects	No	No	No	No	No	No	Yes
N	270	270	270	270	270	270	226

Heckman selected samples in models 9 – 14, IRR reported sample in model 15. Robust standard errors in parentheses. *** p < 0.001; ** p < 0.01; * p < 0.05; † p < 0.1.

5 Discussion and conclusions

5.1 Discussion of results

This thesis studied the implications of cross-border private equity and its relationship with European buyout fund performance. More specifically, this relationship was studied by analyzing the effect of buyout funds' shares of cross-border investments on the funds' returns, through both general cross-border and cross-continent viewpoints. An investment was defined as cross-border if the headquarters of the private equity firm and the portfolio company are in different countries. Moreover, a few interaction effects were studied. First, the interaction of fund size, used as a proxy of general partner skill, was investigated. Next, the club deal share of a fund and its interaction on cross-border share relationship was included. Finally, it was examined whether higher share of investments carried out though a local office moderates the cross-border effect.

The literature review first looked into the trends of international private equity and discussed the nature and challenges of cross-border private equity investing. In addition, opportunities provided by cross-border settings and suggested strategies for overcoming distance-related hindrances were presented. The findings from this part indicated that cross-border investing poses risks for private equity firms because of the cultural distance and institutional differences. However, firms can mitigate these risks by learning and gaining knowledge through engagement in club deals, obtaining multinational investing experience and by setting up local branches. Secondly, the research on private equity investment value creation, fund performance, and performance drivers was reviewed. It was concluded that private equity fund performance is most affected by fund size, general partner skill, fund inflows and syndication.

Based on the qualitative part, it was hypothesized that despite the challenges, cross-border environments would allow for increased investment opportunities, and given the challenges, firms would not engage in such deals without careful and extensive screening. Therefore, it was assumed that a higher cross-border share in a fund would increase fund performance. In addition, it was expected that the challenge-mitigating factors would moderate this relationship. The hypotheses were tested by studying European buyout funds, with vintages between 2000 to 2010, and their domestic and cross-border investments until March 31 2019. The data was drawn from databases of Preqin.

The empirical analysis provided mixed results for the relationship between cross-border investments and fund performance. Some evidence was found that a high cross-border share would affect fund performance negatively which suggests the opposite what was expected. On the other hand, the results implied a positive relationship between cross-continent share and fund returns providing partial support for the hypothesis. In addition, as expected, a positive moderating effect of fund size on cross-border share was found suggesting that large funds perform better in cross-border settings than smaller funds. Finally, only weak partial support for club deal and no support for local office shares' moderating effects were found, although evidence for a positive effect of constituent local office share on returns was provided. In the big picture, these results suggest that the effect of cross-border share depends on circumstances. A more detailed discussion of the results on each hypothesis is provided below.

Hypothesis 1

The analysis provides no evidence that the effect of cross-border share on fund performance would always be positive as was hypothesized. In fact, the results give some indication that the effect might be negative although this result is not statistically significant in the model testing the direct effect and is therefore not robust. On the other, there is evidence that a high cross-continent investment share would positively affect returns. This suggests that there might be differences in the performances of investments made on closer and more remote foreign targets. This logic would be in line with the results of Nahata et al. (2014) who find distance to be a positive success factor in venture capital context and attribute the success to the more diligent screening and monitoring of distant foreign portfolio companies.

In addition, the results provide evidence for a positive relationship between high local office investment share and fund returns. This suggests that the non-positive effect of cross-border share might be driven by pure cross-border investments while local office deals improve performance. This implication builds on the findings of Hammer et al. (2018) who find that performance in local office deals is better than in pure cross-border deals. This explanation is also consistent with the key findings of the interviews that culminate around the following anecdotes: "Private equity business is very much based on trust and credibility earned by building good relationships, connections and networks with all stakeholders" and that "Proprietary deals, which are the source of superior

performance, cannot be attracted without such position as an investor". In light of the results, this implies that cross-border environments can provide improved opportunities if engaged in through a local branch which is better connected to the local market. Overall, hypotheses 1 is partially supported.

Hypothesis 2

The results imply a positive moderating effect of fund size on the relationship between cross-border share and fund performance. This supports hypothesis 2. The effect of high cross-border share on fund performance is largely negative with low fund sizes and becomes less negative as fund size increases. With very high fund sizes the effect is even positive. This suggests that a high focus on cross-border investments likely creates value for large buyout funds but not for smaller funds.

This logic can result from a couple of arguments. First, large funds, especially in Europe, are likely to be faced with limitations in the supply of sufficiently large deals in their domestic markets due to the size distribution of companies. Therefore, they need to seek targets across borders to reduce competition and to perform. In addition, the capabilities of large funds can be more aligned with large cross-border targets. For example, this is supported by comments in the interviews that: "Large firms managing large funds who operate internationally can successfully support targets' internationalization strategies, and therefore might have a competitive advantage over local funds." Small funds, on the other hand, have more opportunities in local markets and foreign firms might struggle to find good deals unless they have distinct specialization knowledge on a specific industry.

Second, a bigger funds might be better off in tackling the challenges posed by cross-border settings, especially those related to peculiarities of foreign environments. This stems from the belief that large funds are managed by skilled and experienced general partners (Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009) who are likely to have experience in multinational investing through which they have gained knowledge and ability to engage in deals without local participation (Meuleman & Wright, 2011).

Interestingly, there is strong evidence throughout the results that fund size, in general, affects fund performance negatively, which contradicts with previous research. However, the funds raised during private equity boom times have been found to perform worse (Axelson et al., 2013; Kaplan & Schoar, 2005) and the fund vintages studied in this thesis

overlap a period of private equity boom cycle shift (Kaplan & Strömberg, 2009). Given the results, hypothesis 2 is supported.

Hypothesis 3

The results provide only weak support for hypothesis 3. There is no evidence that having a high share of club deals in a fund would moderate the effect of cross-border share on fund performance in general. However, weak evidence about such positive interaction on cross-continent share is found. This implies that syndication might be beneficial in cases when the distance to the portfolio company's location is long. This result builds on Tykvová and Schertler (2014) who find that in a venture capital setting, syndicating with local partners does not help in the case of large institutional difference but rather in great geographical distance. European countries have very differing institutional environments (Meuleman & Wright, 2011), and therefore local partners might not be as helpful in geographically closer cross-border deals than in further.

Hypothesis 4

The results provide no support for, or against, the assumption that a high share of local office investments would moderate the relationship between cross-border share and fund performance. This holds through for both general cross-border share and cross-continent share. This implies that the different levels of local office deal share do not influence the way cross-border share affects fund performance.

Contributions

The findings in this thesis make a few contributions to existing literature and industry practitioners. First, and most importantly, they contribute to the literature of private equity, especially that of later stage buyout market and cross-border investments. In general, prior literature has very much focused on the venture capital market, especially on cross-border context. This is puzzling since the growth in private equity fundraising and assets under management is driven by buyout funds (McKinsey & Company, 2018) and one way to scale a business is to expand internationally. The study extends on the literature of cross-border club deals and effects of local branches by connecting them to buyout performance.

In addition to the generally scarce research of buyout performance in cross-border settings, literature has completely neglected these effects on buyout fund level. This study helps to lower the gap by providing views on fund-level performance effects in the cross-border context. Consequently, the study contributes to the discussion on the determinants of buyout fund performance. Previous research has mainly focused on analyzing the effects of persistence, general partner skill, syndication and macroeconomic situation. Little is known about the effects of certain investing strategies on fund performance, most likely due to the difficulty of analyzing such investing behavior. This thesis sheds some light on the effects of funds' investing focus on their performance by studying the intensity at which funds invest across borders.

This thesis also makes a few contributions to industry practitioners. This is important since the private equity industry is booming, valuations are at record highs and it gets difficult for firms to find good deals. Therefore, general partners need to consider strategies for sustaining the performance of their funds and sufficient deal flow. In addition, the growth in the market suggests there may be room for private equity firms to scale their business and expanding across borders could be a valuable option. The results in this thesis provide insights for the decision-making in international private equity investing.

For general partners the implications are that investing across borders, without having a local branch carrying out the investing process, can be difficult. This holds true especially for less experienced funds as skilled general partners with large funds sizes are likely to perform better in foreign environments. Moreover, the results suggest that when investing in distant environments, extra careful and rigorous screening and monitoring processes may need to be taken. In general, expanding operations internationally by opening local offices can be a successful strategy for a buyout fund. On the other hand, limited partners can analyze the investment behavior of private equity firms, especially those with high cross-border investing frequency. This can be beneficial when limited partners decide on where to direct their capital.

5.2 Reliability and validity

5.2.1 Reliability

Reliability in quantitative research refers to the consistency of the results over time and whether the results can be reproduced under the same methodology. More specifically, reliability refers to how a repeated measurement remains the same, the stability of the measurement over time, and the similarity within a time period (Kirk & Miller, 1986). In this thesis, the reliability concerns the choice of variables and the availability of data. Regarding variables, all of them were either directly based on variables used in prior research or modifications of those. The main independent variables of cross-border share were based on definitions of cross-border investments in similar studies but were aggregated to the fund level making them novel but intuitive measurements based on existing research. The same applies for club deal and local office variables. The experience and specialization variables were also based on methods applied in prior research.

As such, the variables used do not set any limitations for the replicability of the study given the availability of the data. If data is available, the same variables can be used again and over time. All the data is such that it is similar for all observations as fund net IRR is measured the same way and fund size is just a reported value. However, as private equity industry is cyclical, and firms develop as the industry matures, the results can vary over time. Therefore, control variables capturing these effects were used.

In addition, the availability of data in the private equity industry in general poses challenges for fund performance research due to the voluntary nature of data reporting. However, as was done in this study, possible selection bias can be considered with statistical methods. Further, the data here included funds from multiple geographical locations and funds of different sizes suggesting that types of funds from the entire population were represented in the data.

5.2.2 Validity

The research validity refers to the accuracy of the measurements and that they actually measure what they were intended to measure. In this study, validity concerns the analysis methods, the variables used and the accuracy of the data. The hypotheses used were formed by using a deductive approach where the hypotheses are based on synthesizing

prior research. As the object of analysis is tested based on the theories of previously validated studies, the approach provides a logical and a reliable measurement.

The research methods, namely the descriptive analysis and the regression analysis, are both very broadly used in private equity research and in quantitative analysis in general. For the regression analysis, the most common type ordinary linear squares method was used. In addition, the methods for accounting for possible selection bias were rationalized based on prior research. The analysis and handling of data was conducted carefully and systematically in order to limit the possibility of errors. The data sourced from Preqin can also be considered accurate due to the wide use of their data in academic and professional settings.

Due to the variables and methods being rationalized by existing literature, and results providing significant effects, the measurement can be considered a successful measure of what was intended. This is particularly important as the phenomenon of cross-border investments' influence on buyout fund performance has not been studied before. Despite the fact that the main hypothesis was only partially supported, the theoretical part provides arguments and explanations for the results.

Validity also refers to the extent the results of a study can be generalized across other samples and wider population. In this study, the data was limited to consider only European buyout funds with vintages of 2000 to 2010. Therefore, the results are representative in the European population. However, controlling for country fixed effects slightly altered the results suggesting that there might be differences in the data across different countries. Furthermore, the study cannot be justified to be generalizable to the whole world as the effects might be very different especially in the US, which can be considered the most sophisticated buyout market.

Compared to other studies analyzing fund performance, the sample period is slightly shorter than usual but in line with the studies that have used Preqin as their data source. On the other hand, the deal data covers a period of over 18 years, which can be considered representative. The fund vintages fall over a period that included an end in the private equity boom cycle and a global financial crisis that might affect the generalizability of the results, although vintages were controlled for and the investment follow-up period considered being long enough. In addition, cross-border private equity has not been very

common before the chosen period, and therefore the effect should be analyzed based on recent times.

Overall, in light of the focus of the study and the underlying research objective, the results can be considered generalizable. As the objective was not to estimate absolute fund returns but rather the relative effect of cross-border share of a fund on those returns, the results provide an overall view on the average direction and size of the effect.

5.3 Limitations

Although concluded to be a reliable and a valid study overall, this thesis is faced with a few limitations. Most importantly, these limitations are related to the homogeneity of the data sources. In fact, all data used in the study, except firms' local office information, was sourced from the databases of Preqin. This may affect the results since, for example, Preqin determines industry classifications or since there may be consistent error somewhere in Preqin's data gathering or reporting processes. As discussed above, however, Preqin is widely used and these types of limitations are unlikely. Nevertheless, prior research studying fund performance has often used and compared data extracted from different sources in order to increase the robustness of the data.

Private equity research in general struggles with the limitations posed by the availability and reliability of data and this study is no different. Less than half of the funds included in the original data export report any performance data and even less report IRR information. Regarding deal data, a little less than 60 % include fund information. In addition, there are significant differences in the number of deals per fund as some funds were associated with only a few deals and others with well over a hundred. This raises questions about the reliability of the data since a very limited number of deals made by a fund is most likely not representative of the actual number. Furthermore, there have been inconsistent findings in previous research on the accuracy of the reported interim IRRs and net asset values by a fund. However, in light of newer research the values were concluded to be sufficient enough for the purposes of this study (Kaplan & Sensoy, 2015).

Due to the absence of a similar study in previous research, the main independent variables of cross-border and cross-continent shares have not been used before. Especially, it is difficult to assess the effect of individual deals on a fund level since their contributions

to the returns of a fund are not disclosed. Although buyout funds often follow a certain strategy in the sizes, industries and types of deals they make, some deals most likely contribute more to the overall performance of the fund. Any individual characteristics of the deals have not been controlled for in this study and all deals are included equally-weighted. Rather, these effects are aggregated to the fund level as shares of the total fund deal activity, which depicts the frequency of that a fund engages in such deals.

Furthermore, the study might be faced with possible endogeneity issues that ideally should be addressed. These issues stem from the fact that private equity firms do not engage in cross-border investing randomly. Therefore, the explanatory variables measuring cross-border and cross-continent shares are prone to endogeneity. Oftentimes, this type of a study is not an experimental research with a random sample and a control group which would prevent the variables being endogenous. Instrumental variable techniques and Heckman selection correction are possible ways to address the bias.

5.4 Future research

This thesis contributes to the cross-border private equity research by being the first study to analyze the relationship between cross-border investments and private equity fund performance in the buyout setting. Furthermore, it strengthens the position of European private equity research, as studies on US-based firms are far more common. As internationalization and cross-border investing provide an interesting opportunity for firms to scale their business and increase deal flow, the implications of such investing are important to be studied. The results provided by this study, as well as the few limitations, provide interesting avenues for future research.

Firstly, difference in the results of the effects of general cross-border share and cross-continent shares warrants for more thorough research on the determinants of these differences. Especially, it could be studied whether a large distance between the general partner and the target company leads to more rigorous and careful due diligence and monitoring, therefore increasing the chance of selecting superior targets and increased value-adding activity. Therefore, variables capturing the geographical and cultural distances should be included. In addition, the factors affecting the success in cross-border buyout transactions should be studied.

Secondly, given the positive performance effects of local office deal share, it would be valuable to understand how firms choose the locations they end up establishing offices in. In particular, it would be interesting to know what the specific gains are that a firm gets by establishing a local branch. This could help firms determine whether expanding operations internationally is profitable, or could such gains be obtained with fewer investments. Furthermore, an overall understanding on why firms choose to engage in pure cross-border deals would be beneficial since, given the suggested challenges, it could be expected that the deals in question are perceived superior.

Finally, to provide robustness for the study, it would be valuable to conduct a similar analysis on a larger dataset gathered from a different source. Different timeframes can yield different results especially on a cyclical business such as private equity. For example, fund size has often been found to positively affect fund returns, while in this study the effect was opposite. In addition, different databases may have different data sourcing and reporting methods, which could affect the availability or reliability of the data. Replicating the study on a larger sample and data from different sources would contribute to the generalizability of the results.

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